

By the Author, Dr.

*Gleanings of
Low Voltage
Technique*



by

Geo. A. Remington, M.D.

A Creed for All of Us

There is nothing in the annals of medical history more potent in meaning, more generous in praise, more brilliant in literary style, more pregnant with human thought than—The Oath of Hippocrates.

May we so righteously uphold those tenets for our profession inscribed with such dignity by the Father of Medicine, that he may smile benignly on each of us—proudful of all of us.

—The Author

Gleanings of Low Voltage Technique

by

GEORGE A. REMINGTON, PH.G., M.D.

CHICAGO



Privately Published

1932

Copyright 1932
All rights reserved
by
George A. Remington, M. D.



Geo. A. Remington, Ph. D., M.D.

To my friends in the profession, who are seriously interested in the advancement of Physical Therapy and the betterment of human welfare, this book is earnestly dedicated.

—The Author.

INTRODUCTION

Difficulties in treatments and lack of results from therapeutic measures arise more often from lack of knowledge of the proper use and application of available measures than from unfamiliarity with the disease or condition or the general characteristics of the therapeutic method involved. This is particularly true of the older, conventional methods and quite as applicable in the modern realm of physical therapy.

Pioneers in this realm seeking for truth and joined by many other advanced thinkers in the profession have contributed largely to the fund of knowledge needed for the betterment of human welfare, but the dissemination of such information in a clear, concise form is essential, if all of our colleagues are to benefit and be enabled to relieve and cure the ill and misery so readily amenable to a scientific and practical understanding of the elements of physical therapy and their application.

Many of my friends in the profession, who are users of the Polysine Generator, have urged that I should bring together those facts gleaned from long experience in the use of low voltage therapy. The impulse to do so was accentuated by recognition of a real need for such a text, primarily intended to emphasize the use of the Polysine Generator, and a desire to fulfill the urgent requests made of me by my more intimate colleagues and many thousands of other users of this apparatus. To accomplish such a task, in addition to compiling the findings of my experience, it was essential that I obtain the full co-operation of the manufacturer of the apparatus and also the assistance of numerous members of the profession, better qualified than I because of intensive specialization, to supply those paramount facts otherwise not available. It is gratifying to record that such co-operation has been given—heaped-up, brim-full and running over, and I am happy to announce the completion of my work.

My experience leads me to hope that this book may be found to contain the fundamental information required and eagerly sought by many members of the profession. If this object is attained, the book should also be useful to all students of physical therapy, though it deals less with the scientific problems underlying its principles than is usually considered necessary in such a text.

I have endeavored particularly to indicate the possibilities of treatment, to show that these possibilities depend generally upon correct diagnosis based on an appreciation of the significance of symptoms, and to outline in an understandable way the most effective utilization and application of the various modalities of low voltage currents and adjuvant measures in order that outstanding results may be accomplished wherever a low voltage technique is indicated.

—George A. Remington, M. D.

1305 East 63rd Street,
Chicago.

Gleanings of Low Voltage Technique

Galvanism

A Debt of Gratitude

This book would hardly be complete were I not to express sincere appreciation of the great assistance given by many members of the profession in the preparation of the text, and in particular—Mr. George R. Hogan, Mr. H. P. Pullwitt, Mr. Charles E. L. Hanson, and Mr. H. C. Marcy, whose counsel, helpful suggestions, and facilities placed at my disposal have contributed much to the successful completion of my work.

—The Author.

The Galvanic current is named after Galvani, who, in 1786, conducted his famous “frog leg” experiment in Bologna, Italy.

For many years Galvanic current was obtained from wet batteries or dry cells. These, however, were cumbersome, and required so much attention and frequent replacement, that most practitioners have discarded them.

The modern Galvanic apparatus of today connects directly to the ordinary lamp socket of the commercial current supply line.

With the new, improved Polysine Generator you merely flip a switch and immediately have available a Galvanic current under complete control, weak or strong as required, of constant, interrupted or pulsating character, and it may be combined with the Sinusoidal current by simply turning the knob of the *modality selector*.

The Galvanic current, sometimes called direct or continuous current, flows constantly in the same direction and therefore, has a definite polarity; a distinct positive and negative pole.

It is the only current which has a true chemical action.

As the action of the positive pole is diametrically opposed to that of the negative pole, it will be evident that a thorough understanding of such “polar effects” is the key to the successful and proper use of the Galvanic current.

GLEANINGS OF LOW VOLTAGE TECHNIQUE

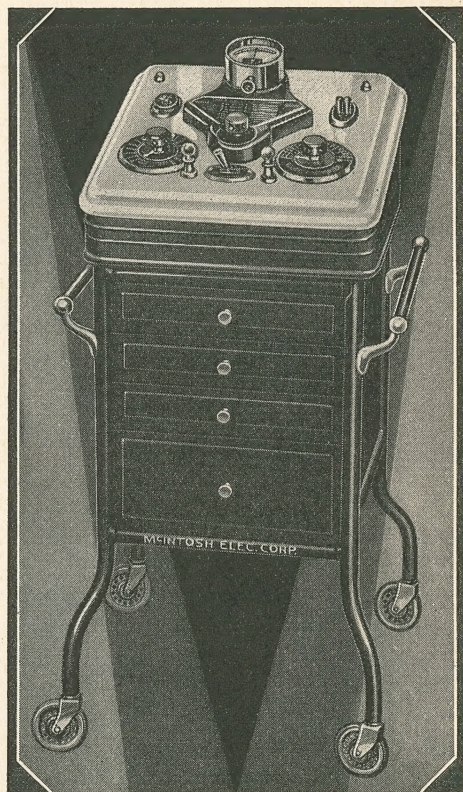
The following table of comparisons by Eberhart shows at a glance the physical and chemical properties of the two poles:

POSITIVE POLE	NEGATIVE POLE
1. Acid reaction	1. Alkaline reaction
2. Stops hemorrhage	2. Increases bleeding
3. Sedative; relieves pain	3. Irritates
4. Soothes inflammation	4. Causes inflammation
5. Hardens tissue and dries discharges	5. Softens and liquefies
6. Vaso-constrictor	6. Vaso-dilator
7. Germicidal	7. Non-bactericidal

A study of polar effects shows the importance and absolute necessity of being sure of the polarity, whenever a Galvanic current modality is to be used.

You can always be sure of the polarity with the new, improved Polysine Generator, as it provides a double check; first, by means of the *polarity indicator switch*; second, by means of the needle of the milliamperemeter. If the meter needle swings to the right, the right-hand binding post is the positive pole; if it swings to the left, the left-hand binding post is the positive pole.

When a Galvanic current passes through the human body, certain physiological actions and chemical changes take place in the tissues. These are governed by definite well-known laws of physics and will, therefore, produce definite therapeutic results.



*The McIntosh Polysine Generator
Model No. 1258*

GLEANINGS OF LOW VOLTAGE TECHNIQUE

A brief consideration of the fundamental principles involved will show the large field where the use of the Galvanic current is indicated and how it may be intelligently applied.

The body fluids are largely composed of water and, therefore, contain oxygen and hydrogen. In the process of electrolysis, the oxygen, being electro-negative, collects at the positive pole; the hydrogen being electro-positive, goes to the negative pole, and it is this affinity, that gives the two poles an exactly opposite therapeutic effect.

Oxygen is an acid-maker, consequently the tissues adjacent to the positive pole are rendered acid. An acid condition is against pain, so we call the positive pole sedative.

Hydrogen is an alkaline-maker, therefore hydrogen collecting around the negative pole will render the tissues in the immediate vicinity of this pole, alkaline. An alkaline condition produces stimulation, or irritation.

The positive pole by its acidity coagulates the albuminoids of the blood and thereby hardens or shrinks tissue.

The negative pole acts much like caustic soda or potassium, softening, disintegrating or liquefying tissue. Because of this, whenever we desire to produce decomposition of tissue, such as warts, moles, or in fact, any benign growth, the negative pole is used.

The positive pole by its vaso-constrictor action lessens the lumen of the blood vessels, thereby decreasing the blood supply of the part.

The negative pole, by vaso-dilator action, dilates the blood vessels.

Medical Ionization

Medical Ionization, sometimes also called Ionic Medication, is the term used for introducing the ions of soluble medicinal substances into the tissues by means of the Galvanic current.

Professor Leduc of Nantes, France, was the first to introduce

Ionic therapy. He discovered the laws, which regulate its application, and also observed the properties of many of the ions.

Friel, Cumberbatch, Neiswanger, Massey, and others have since perfected the method to such a degree, that it is today established on a thorough, scientific basis.

Ionization is indicated in all pathological conditions dependent on germ origin, where the affected area is accessible. Neiswanger said, "In cases of trachoma, lupus, indolent ulcers, endometritis, fistulous tracts, and many other germ troubles, its action is not excelled by any other remedy."

Excellent results have been reported by Friel in Otitis Media with zinc ionization.

Grover states: "If there is any science in the application of drugs to diseased conditions, it is found in ionization,"—and again—"There is nothing in the whole domain of medicine, that will give such brilliant results as evidenced by electrolysis and ionization in selected cases."

Morse sums up the advantages of ionization as follows:

"First, the medicinal action of the metallic salt upon the diseased surface is more accurately localized. For instance, in the treatment of a deep sinus, a copper probe may be carried to the bottom and the copper salts deposited there where most needed; second, drugs introduced into the system in a nascent state are much more active than in chemical combination; third, by cataphoresis, the salts formed are driven into the tissues, rather than laid upon the surface of a mucous membrane, as in ordinary topical applications; fourth, there is obtained in addition, the beneficial action of the physiologic properties of the current."

Cumberbatch cites the treatment of an ulcer with zinc ionization as a good illustration of the power of the Galvanic current to cause the penetration of ions into the tissues.

"Using a 2 per cent zinc sulphate solution applied from the positive pole of the Galvanic current and allowing the current to pass for 10 minutes, the granulated tissue acquires a pearly white color, not only on the surface, but in the deeper parts."

"The application of the same solution to the granulations at the base and edges without the use of the Galvanic current, produces no result that is visible to the eye."

The ions most frequently used in medical ionization may be placed in two groups; those with a positive charge, called cations, and those with a negative charge, called anions. Cations are applied at the positive pole; anions are applied at the negative pole.

The following table will serve as a quick reference:

CATIONS—Positive Pole	ANIONS—Negative Pole
Zinc	Chlorine
Copper	Iodine
Mercury	Salicylates
Silver	And all acids
And all bases	

Eberhart suggests a convenient and easy way to remember on which pole to place a solution or metal for ionization: "Bear in mind that in chemical nomenclature, with few exceptions, the positive part of the combination is given first and the negative part second, thus in potassium iodide, the potash is positive, the iodine is negative.

"Consider what part of the solution you wish to drive into the tissues and put it on the pole corresponding to its own polarity."

The strength of solutions should be 1 to 2 per cent.

Ions travel with a comparatively slow rate of speed. Therefore, a long treatment with a relatively small milliamperage will produce better results than a short treatment with a larger amount of current.

The current should be absolutely smooth, free from fluctuations and under perfect control.

The new Polysine Generator is ideally suited for this work because a new, specially designed filter system delivers a Galvanic current that is exceptionally smooth, and the delicacy of control is unexcelled.

A Few Simple Tests

To the physician, who has had little or no experience with Galvanic (Direct) and Sinusoidal (Alternating) currents, a few simple experiments will prove both instructive and interesting.

Place the metal tips of two conducting cords in a glass of water, fairly close together, but not allowing them to touch each other. Connect the other ends of the cords to the positive and negative poles of the straight Galvanic current. Now turn on the current gradually and you will observe tiny bubbles of gas forming around one tip. The gas is hydrogen, which is liberated at the negative pole. If the current is allowed to flow a little longer, bubbles will also be noticed on the other (positive) tip, but only half as many. Thus we can show what is known as the electrolytic or chemical action of the current by splitting up water into its two component elements, H and O, in the proportion of H_2O .

An interesting test may be made to show how the positive pole of the Galvanic current will shrink and harden tissue, while the negative will dilate, soften and liquefy tissue.

Attach two steel needles to the free ends of a pair of conducting cords and insert them in a piece of raw meat about three inches apart. Turn on a fair amount of current—20 to 25 milliamperes and allow the current to flow for a short while. Then gently pull out the needles. You will find that the one connected to the negative pole will come out easily, whereas the needle at the positive pole sticks firmly in the tissues.

Another simple test can be carried out by moistening a piece of white blotting paper with a saturated solution of potassium iodide. Place the tips of a pair of conducting cords on the blotter, turn on the Galvanic current and draw the tips over the moistened area about one inch apart. Immediately a brown stain on the blotter will appear under one tip, indicating the presence of free iodine, which is attracted to the positive pole.

(Note: Do not use nickel-plated tips for this test. If tips are plated, scrape or file off plating. Use only brass or copper tips.)

Now repeat the same experiment, but substitute the Rapid or Surging Sinusoidal for the Galvanic Current. No Iodine stain will appear under either cord tip, because these currents have no polarity effect and hence, no apparent chemical action. Strong currents may leave a trace of oxide on the blotter, the color dependent on the metal used in the cord tip.

If the same test finally is made with the Slow Galvanic Sinusoidal or Super-Imposed Wave, the brown iodine stain will appear as a broken intermittent line on the blotter, alternating under both cord tips as the current rhythmically reverses its polarity.

Electrodes

Where pad electrodes are applied on the skin they should be of fairly large size to eliminate an excess of current concentration and skin irritation. These electrodes should be made of proper materials and kept in good mechanical as well as sanitary condition. Before applying to the patient they should be soaked thoroughly in warm water. Some writers even recommend soaking them for two hours. Using a saturated solution of Sodium Bicarbonate increases conductivity of the skin.

The new "Kantbern" Pad electrodes are especially designed and constructed for such work and will satisfactorily meet all requirements.

"KANTBERN"

(Trade Mark Reg. U. S. Pat. Off.)

Asbestos Pad Electrodes

The bibulous asbestos fibers, which are used in the construction of these electrodes have the property of uniform moisture distribution. This assures a more uniform distribution of current eliminating cutaneous or surface irritation so commonly found with other pad electrodes.



GLEANINGS OF LOW VOLTAGE TECHNIQUE

They are supplied in the following sizes:

- No. 6330. New Style Extra Thick, size 4"x 6".
- No. 6331. New Style Extra Thick, size 4"x 10".
- No. 6332. New Style Extra Thick, size 2"x 8".
- No. 6333. New Style Extra Thick, size 3"x 5".
- No. 6334. New Style Extra Thick, size 2"x 3".

These have been found to supply a choice of sizes adaptable to almost every treatment calling for the use of a pad electrode.

Good, uniform contact with the parts to be treated is absolutely essential. The use of ordinary, red rubber sponges often will help to secure a perfect contact between skin and electrode, when the pads are applied over the spinal region.

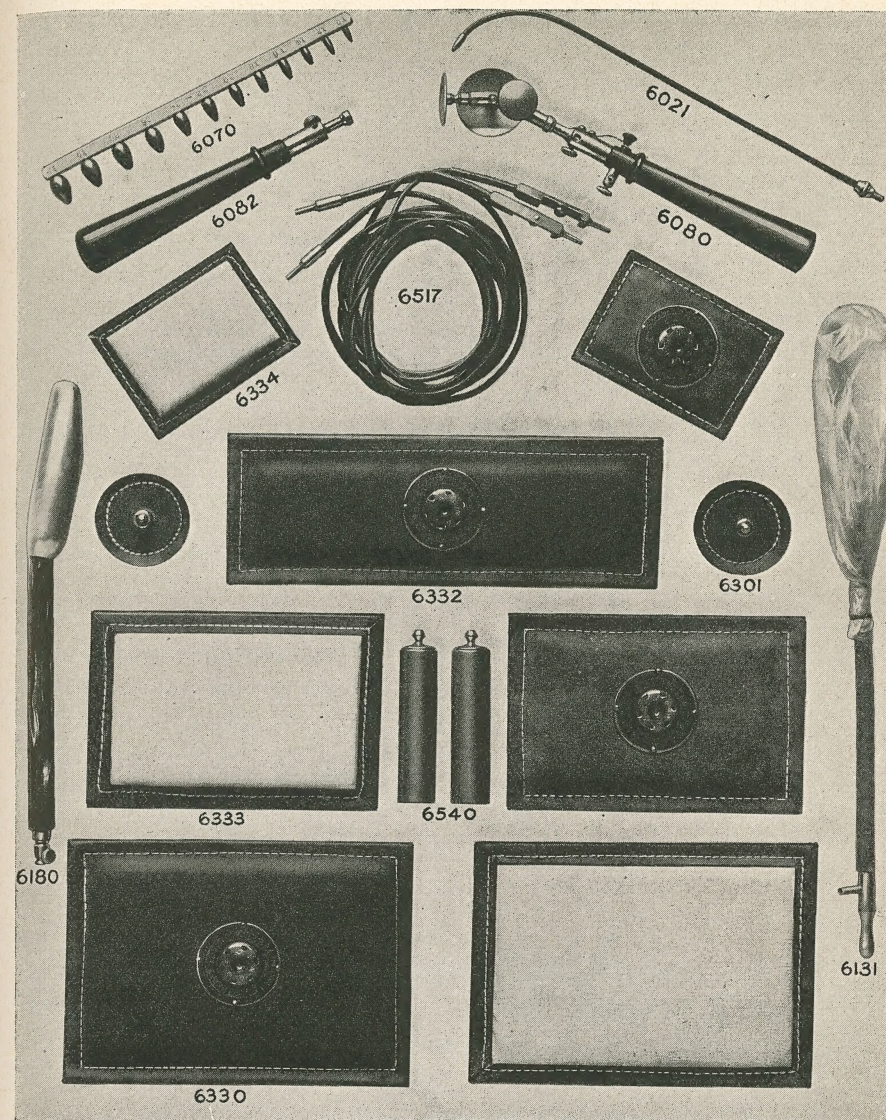
When two electrodes of different size are used, the smaller is called the active and the larger the indifferent, or dispersive electrode. As the indifferent electrode is used merely to complete the circuit, it should consist of a good sized pad, which will reduce the local action under it to a minimum.

As an equal amount of current passes through both electrodes, it will be seen that the current density must be greater in the smaller electrode and naturally its action becomes more intense as the current is concentrated in a smaller area.

Except where definite action is desired from a metal electrode, as in electrolysis or metallic ionization, the Galvanic current should only be applied with covered electrodes; otherwise painful irritation and burns will result, if any intensity of current is employed.

When the current is to be applied to the mucous membrane, as for instance, the nose, ear, vagina, uterus, cervix, prostate, urethra, and rectum, special electrodes are employed. These are made in a great variety of shapes and different metals, and designed to meet the particular requirements of the case.

GLEANINGS OF LOW VOLTAGE TECHNIQUE



Special Electrodes and Accessories to be Used with the Polysine Generator

Before beginning the treatment, make sure that all connections are tight, that the polarity is right, and make sure that the rheostat or *current regulator* is at the lowest point or off.

Always turn on the current slowly, and gradually increase it. This eliminates discomfort and sudden shock to your patient. Instruct your patient to tell you of any undue sensation he experiences—never disregard a patient's complaint of discomfort or undue pain—stop the treatment and investigate. When a treatment is continued for a longer time than 15 or 20 minutes, it is advisable to split it up and again soak the pads, so as to prevent excessive skin irritation. On termination of the treatment, turn off the current slowly and completely before removing the electrodes and allowing the patient to get up.

Attention to these details will not only improve your technique, but will earn the respect and appreciation of your patient.

Frequency of Sine Waves and Interruptions An Important Factor

The physiotherapist, who wishes to obtain the highest success in the treatment of degenerated nerve and muscle tissue, will find that the wave-frequency and interruptions of the current which is applied are of great moment.

A degenerated muscle usually contracts to a much slower degree than a normal muscle. The normal rate of peristalsis is about eight to ten per minute. The average wave current generator on the market is capable of producing normal peristalsis in a normal muscle; but where the muscle has degenerated somewhat, it will contract at slower than the normal rate, and the second impulse of current comes on before complete relaxation from the last impulse has been produced, thus stimulating a muscle, which still retains part of the stimulus from the last impulse. Such over-lapping of stimuli will in a few minutes produce tiring and exhaustion.

This is entirely obviated and overcome by the new Polysine, because very slow, rhythmical current impulses can be obtained to produce as low as five contractions per minute.

Is It Desirable to Combine Sine Waves With Diathermy?

From time to time various manufacturers have promoted the idea of administering a wave current and diathermy simultaneously, claiming that a greater affect could be had from the wave currents by producing a hyperemia with diathermy. It is granted, that a great objective may be attained in many cases by administering diathermy and following it with the wave currents for massage purposes. However, a little reflection will soon convince the reader of the general inconsistency of applying two such modalities at the same time.

The application of diathermy produces a vaso-dilator effect. The application of wave currents produces a vaso-constrictor effect at the peak of the wave; thus the two modalities are striving to counteract each other when administered at the same time. Moreover, physicians, who have tried this combination, state—that the muscular contractions produced by the wave currents create an irregular apposition between electrode and patient, causing sparks, due to the voltage of the diathermy current.

It appears that the chief object to be gained by the method under discussion is the time saved in application, which should not be allowed to govern the situation.

A Review of Myology

As wave currents are utilized extensively for stimulation and regeneration of impaired muscular function, a brief review of the various types of muscles may be found desirable.

A muscle is defined as an organ, which by contraction produces the movements of an animal organism. Muscles are divided into two groups, viz., striated and unstriated.

Striated Muscles

The striated muscles, sometimes also referred to as the skeletal or voluntary group, include all those in which the contractions are voluntary and in addition, the heart muscle.

When a stimulus is given to a normal striated muscle it produces a fairly rapid contraction which involves the entire body of the muscle at one time.

Unstriated Muscles

The unstriated or smooth muscles include all the involuntary muscles, except those of the heart.

When an electrical impulse is applied to a nerve exciting contraction of an unstriated or involuntary muscle, the contraction is produced in a slow, worm-like motion. The muscle slowly contracts at the point where the stimulus is received; then the contracted part slowly relaxes while the adjoining portion takes up the contraction, then relaxes, and this continues until the original stimulus has acted successively on the entire length of the muscle.

Unstriated muscles are found in the walls of the hollow viscera, viz., the lower half of the œsophagus and the whole of the remainder of the gastro-intestinal tube; in the trachea and bronchi; in the gall bladder and ductus communis choledochus; in the pelvis and calices of the kidney, the ureters, bladder and urethra.

In addition, unstriated muscles are found in the female sexual organs, viz., the fallopian tubes, the uterus, vagina, the broad ligaments and the erectile tissue of the clitoris; in the male sexual organs, viz., the dartos scroti, vas deferens, epididymis, vesiculæ seminales, the prostate gland, the corpora cavernosa.

Unstriated muscles are also found in the ducts of certain glands such as Wharton's duct; in the capsule and trabeculae of the spleen, in the arteries, veins and lymphatics, and in the iris and skin.

The Use of Spinal Reflexes

Much credit is due Charles L. Ireland, M.D., for his enlightening work on the use of spinal reflexes. It is a subject which deserves far more attention from the medical profession than it has received in the past because of the excellent results obtained when the work is well understood and the technique carried out correctly.

Originally mechanical percussion was advocated to elicit these reflexes; however, time, experience, and improved technique have shown, that the wave currents are most desirable because of their ability to contract the involuntary muscles and to elicit the reflexes by stimulation without irritation.

Anatomy and Physiology teach us how certain nerves emanating from the inter-vertebral foramina control the contractions of the organs and blood vessels supplied by them, while other nerves dilate the same organs and blood vessels. We also know, that various organs and glands are supplied with nerves, which stimulate their secretory function, as for instance, the gall bladder, pancreas and mammary glands. Practically every viscus of the body can be made to contract and dilate by the application of proper stimuli to the root of the nerve supplying the organ.

Based on these facts, it can readily be realized, that the various modalities of wave currents as produced by the Polysine Generator afford a most valuable method in the treatment of diseased conditions of the various organs and tissues through the spinal reflexes.

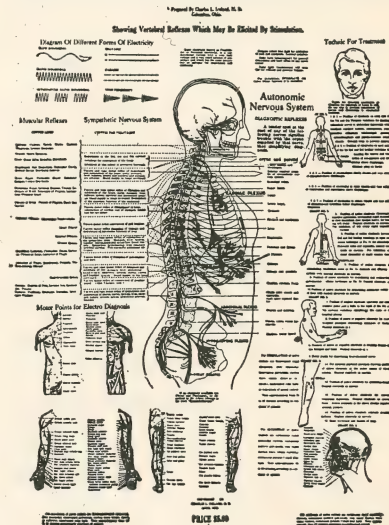
A few examples as to what may be accomplished with this method are cited and the technique illustrated by photographs in the technique section of this booklet. (See: Drainage of Gall Bladder, Duodenal Ulcer, Atony of Uterus, Stimulation of Mammary Glands.)

It should be stated here that the selection of the proper wave current modality as well as its application at the exact point over the root of the nerve are important factors. Proper technique is absolutely necessary to obtain the desired result.

The illustrated chart, prepared by Charles L. Ireland, M.D., after many years of study and practical application, shows the exact nerve centers and vertebral reflexes, which may be elicited by stimulation. It will be found almost indispensable to the practitioner interested in this work. The following are a few of the subjects covered by this chart:

1. Diagram of different varieties of electricity.
2. Nerve centers of the sympathetic nervous system, which may be evoked by concussion or sinusoidalization.
3. Muscular reflexes, which may be excited by electrical stimulation of various forms.
4. Motor points for electro-diagnosis.
5. Indications for the application of light therapy.
6. Nerve centers of the autonomic nervous system.
7. Table of technique for treatment of various conditions with Sinusoidal current.
8. A special diagram showing the muscles of the face and scalp and the motor points for electro-diagnosis.

ELECTRO PHYSIOTHERAPY CHART



The Ireland Chart

This chart is handsomely printed upon heavy paper, 20 inches wide by 31 inches long, with metal bound edges to hang upon the wall where it is always ready for reference.

Electro-Diagnosis of Nerves and Muscles

Electrical testing of nerves and muscles forms an important part in the diagnosis of peripheral nerve injuries, muscular atrophy and paralysis.

The method, if properly carried out, often discloses information that cannot be obtained in any other way. The special value of electrical testing lies in the fact that the electrical phenomena are objective signs, over which the patient has no control whatsoever.

As many eminent authorities have written voluminously on this rather intricate subject, only a brief resume of the fundamentals underlying this work will be given here.

The nutrition and tone of a muscle fibre are governed by nerve impulses originating in the motor nerve cells situated in the anterior horn of the spinal cord. When these impulses are cut off from the muscle either by traumatic injury or disease of the nerve or an abnormal condition of the anterior horn cell, the muscle substance soon undergoes degeneration. This is shown by the rapid manner in which the muscle atrophies. Such loss of normal tone is very evident as the muscle hangs loosely and flabbily between its bony attachments. On examination it is found to be cold, because of the defective circulation through it; later on paralysis is evident.

In this condition the muscle responds abnormally to electrical stimulation. This response is called the "Reaction of Degeneration" (R.D.).

When the normal muscle or its motor nerve is stimulated by the Interrupted Galvanic Current, the response to the stimulus is a short, sharp, brisk contraction followed by a quick relaxation. This is due to the fact that the electric current stimulates the normal muscle through its nerve fibers and as these fibers act as excellent conductors of electricity, the response is rapid.

When the muscle and nerve are degenerated, the nerve does not conduct electrical impulses readily. The Interrupted Galvanic current affects the muscle directly, but the effect is slow, as the current is transmitted more sluggishly through the muscle tissue. It is well to remember here that the Galvanic current produces no contractions of a normal muscle when the current flows constantly with uniform strength. However, if the current is suddenly stopped or cut off, a muscular contraction is produced. The same holds true if the current is suddenly turned on.

It should also be noted here that when the active electrode is connected to the negative pole, the contractions are much greater than when connected to the positive pole. Also, the normal muscle will contract sooner (with less milliamperage) when the circuit is closed than when the circuit is opened (interrupted) if the test is made with the negative pole as the active electrode. This point is important when testing muscles for "Reaction of Degeneration."

For a correct diagnosis of the seat of a nerve lesion it is necessary to place the electrode exactly over the "motor point" of the muscle, as this is the point at which the nerve enters the muscle, and therefore, stimulation at this point results in its maximum contraction.

Before making the test, it is of greatest importance that all of the affected part should be completely supported; there must not be the slightest drag on the muscles.

The technique used in thousands of cases in U. S. Army Hospitals, is as follows:

The indifferent electrode consists of a fairly large sized pad (a 3"x5" or 4"x6" will do). This pad is thoroughly soaked in warm water and placed on the region of the spine which supplies the muscles to be tested; thus for testing the upper extremities, the pad would be placed over the brachial plexus, for the lower extremities it would be placed over the sacral plexus, and for other muscles of the body, over the sacrum.

The active electrode consists of a small spongio disc and a handle with a "make and break" key. This electrode is thoroughly soaked in a salt solution and then placed on the motor point of the muscle and the current turned on to a strength of about 3 milliamperes.

The test should be performed with the negative pole connected to the active (spongio disc) electrode, the current turned on and immediately broken as required. At the same time, the muscle is carefully watched for any response which might take place. Gradually increase the current to the point where the muscle responds.

The contraction of the muscle as a rule is well indicated by a slight tightening of the tendon or twitching of the joint which it works. At the first sign of response, the strength of the current in milliamperes should be observed and carefully recorded.

"Reaction of Degeneration" is likely to be present in those cases where there is a marked damage of either the anterior horn cells or of the nerve trunks emanating from these cells.

This part of the nervous system is called the "lower motor neuron," in contradistinction to the "upper motor neuron," that is, the motor cell in the Rolandic area of the brain and the nerve fiber emanating from it and passing down the cord as a pyramidal tract. Lesions of the "lower motor neuron," if long continued, will result in degeneration and show "Reaction of Degeneration" on electrical test; lesions confined to the "upper motor neuron" do not show "Reaction of Degeneration."

The more common lesions of the "lower motor neuron" are: First, lesions of the anterior horn cells such as Anterior Poliomyelitis (infantile paralysis), or progressive muscular atrophy. Second, lesions of the nerve trunk resulting in either ulnar or median paralysis due to injury; long-continued pressure on a nerve trunk as evidenced by Wrist Drop from involvement of the musculo-spiral nerve in callus—severe cases of facial paralysis due to compression

of the facial nerve in the stylo-mastoid foramen—degeneration of the nerve trunk—long continued peripheral neuritis, plumbic or arsenical poisoning, post-diphtheretic paralysis, alcoholism, etc.

These tests should be repeated every 30 days and by comparing the records made of milliamperemeter readings from each test, it is possible to determine accurately the progress of recovery towards normal.

Dr. Ireland's Electro-Physical Therapy Chart will be found a valuable guide in this work, as it clearly shows the motor points used for electro-diagnosis.

Preparation of the Patient

Quite frequently patients being treated for the first time will not properly relax unless mentally prepared and made comfortable. A few words of explanation about the nature of the treatment and the sensation they will experience, will put them at ease and secure their co-operation.

Patient's clothes should be adequately protected by towels or rubber sheeting.

Examine the skin carefully for abrasions, cuts, pimples or open wounds, where the electrodes are to be applied. Wherever the skin is abraded, broken or absent, the resistance to the current is greatly lowered. This causes an undue current concentration at this point and results in severe irritation and possibly burns to the patient. If such skin lesions are found, they must be protected and covered by collodion, adhesive plaster, or other suitable material.

A dry skin offers a high resistance. By thoroughly moistening the skin with a warm saline solution, 2 per cent, and removing all traces of oil, grease, ointments, etc., with soap and water or alcohol, the passage of the current into the tissues is greatly facilitated.

The McIntosh Polysine Generator

Model No. 1258

The apparatus illustrated on the following page represents an important contribution to the science of Physical Therapy.

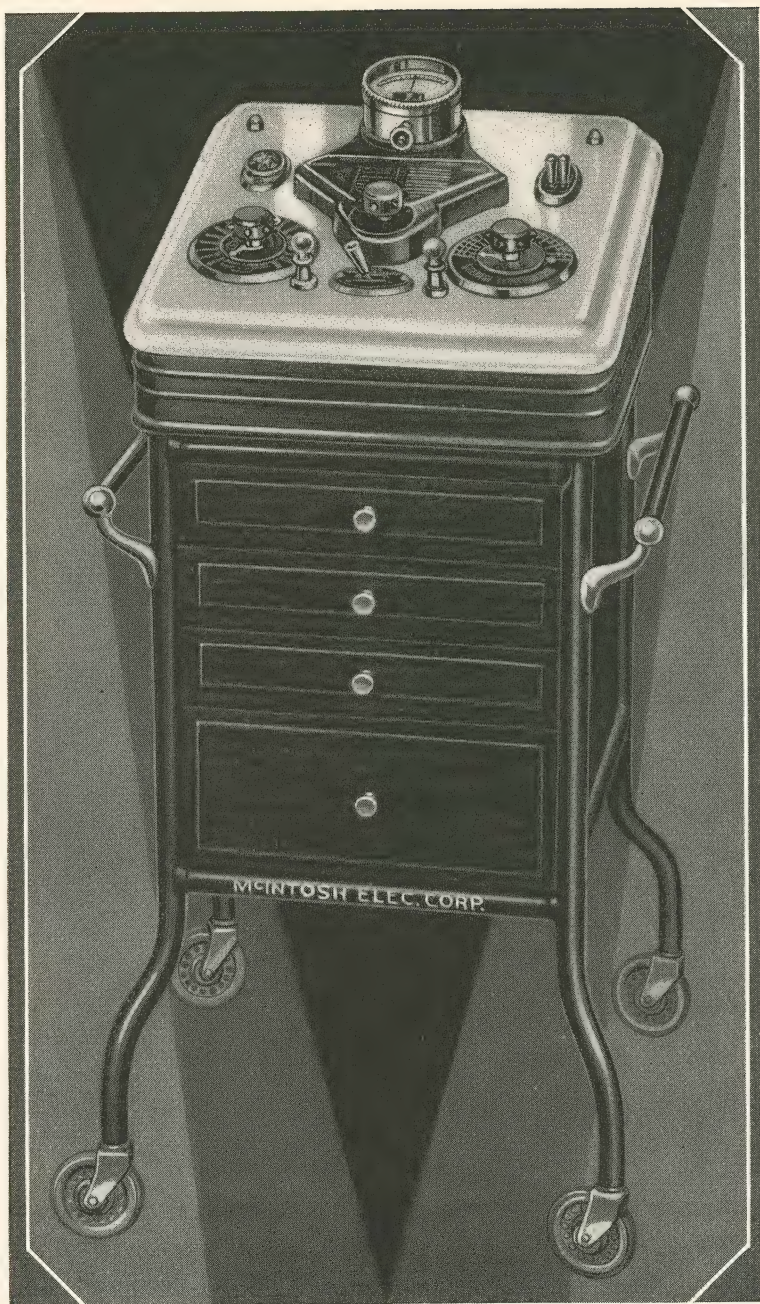
By means of a radically new departure from all existing types of wave current generators, the designing engineers have embodied in this apparatus means of obtaining currents for stimulation of neuro-muscular tissue to a higher degree than ever before attained. By means of the development of an original type of frequency converter termed the "Penetrator," entirely new electrical currents are made available, capable of producing the most profound stimulation of neuron and muscle, with an entire absence of sensory effect to the skin. On account of the deep contractions thus afforded, the term "Penetrator" was suggested as most accurately describing its function.

On account of the great change in the character of these newly developed electrical currents, it has been found desirable to differentiate them from all previously known wave currents and by reason of their wave form, to term them "Oscillatory Wave Currents," for reasons which will hereafter be made known by a careful study of their formation.

A distinct advance over the conventional method of securing Galvanic current has been effected by means of copper-oxide rectification, possessing many advantages over the older methods.

No motor or generator need be in operation when employing Galvanic current; hence the apparatus is silent, while the resultant current is as smooth as a battery current, owing to the most effective filter system employed to eliminate all ripple effects.

This new rectification method eliminates many wearing parts, such as brushes and commutators for Galvanic production, and adds many years of life to the equipment, with the minimum of mechanical attention.



THE NEW MCINTOSH "POLYSINE GENERATOR"

Model No. 1258

(Trade Mark Reg. U. S. Pat. Off.)

Covered by U. S. Patent No. 1,764,347.

GLEANINGS OF LOW VOLTAGE TECHNIQUE

This apparatus affords 16 well chosen modalities including, in addition to the Oscillatory Wave Currents, those older types of sine wave modalities and Galvanic wave forms which have found a definite place in Physical Therapy; hence, offers all advantages possessed by other types of low-voltage generators, with the additional enhancement of the newer types of waves.

Owing to the simplicity of the construction of the electrical circuits, the operator is enabled to obtain his objective in the simplest possible manner. The well known Dial Current Selector enables the operator, at a glance, to select the modality desired and to place it instantly in service, without the annoyance of studying charts of wave forms and selecting cryptic combinations of switches and binding posts; consequently enabling the busy physician to instruct his assistant to use a certain modality, with the definite knowledge that the correct form will be used. Means of modifying the wave forms, affording various types of waves, is provided including means for obtaining sustained peak voltage of certain modalities and for interrupting other wave currents. It is extremely compact and mobile and is adaptable for use either in a physician's office or in a hospital. The Penetrator and rotor mechanism for producing sine wave forms, the rectifier, transformer, filter system, and all switches and operating parts are concealed under the base, thus making the apparatus practically dust-proof. It is equipped with an efficient oiling system for the motor and requires a minimum of attention.

The frequency may be adjusted to the degree desired by turning the *Control Knob*, while the *Frequency Dial* indicates the rate selected and the pulsations of the current are indicated by a very effective pilot light reflected through a jeweled lens.

Attention is called to the perfect regulation of current strength of all modalities delivered to the patient. This is obtained by means of a shunt wire rheostat, which affords an almost imperceptible increase and decrease of current strength.

Accurate measurement of the Galvanic Current, the various Galvanic Wave currents and the Oscillatory Wave Currents is afforded by the Milliamperemeter, d'Arsonval type, provided with

two scales, one reading 0 to 30 and one reading 0 to 150. The oscillation of the Slow Galvanic Sinusoidal Current and the Super-Imposed Wave current is also indicated by this meter.

In keeping with newer standards of engineers and physicists it has been thought desirable to slightly amend terminology on this subject. The modality formerly known as the "Uni-Directional Galvanic Wave" is now termed the "Galvanic Wave." The term "Slow Galvanic Sinusoidal" has been replaced by "Galvanic-Sinusoidal." The term "Alternating Sinusoidal Wave" has given place to "Rapid Sinusoidal Wave." The Oscillatory Waves, Nos. 8 to 12, have a nomenclature of their own.

In harmony with the splendid engineering principles adopted in the construction of the new Polysine its finish is equally impressive. All control switches and dials are black enamel, presenting a striking contrast against the heavy porcelain-enameled base upon which they are mounted; and harmonizing with the attractive metal stand finished in brown mahogany.

The stand contains four drawers, which will hold a great assortment of electrodes, and is fitted with large rubber-tired casters, 3 inches in diameter, responding to the slightest touch. The porcelain-enameled base is $17\frac{1}{2}$ inches by $18\frac{1}{2}$ inches in size. The floor space occupied by the stand is 18 inches by 19 inches, while the total height over all is 42 inches.

When the Polysine Generator was first designed and manufactured in 1909, the descriptive term "Sinusoidal Apparatus" was commonly in vogue. However, in order to distinguish the new apparatus from other types, the coined word, "Polysine" was applied, the significance of which is apparent. This name has become so thoroughly established that it is quite common to hear a physician say, "No, I don't happen to have a McIntosh Polysine, I have a _____ Polysine," not realizing that there is but one Polysine Generator.

The various wave currents such as Nos. 3, 4, 6, 7, 8, 9, 10, 11, 14 and 15, are obtained by impressing upon the rotor or wave pro-

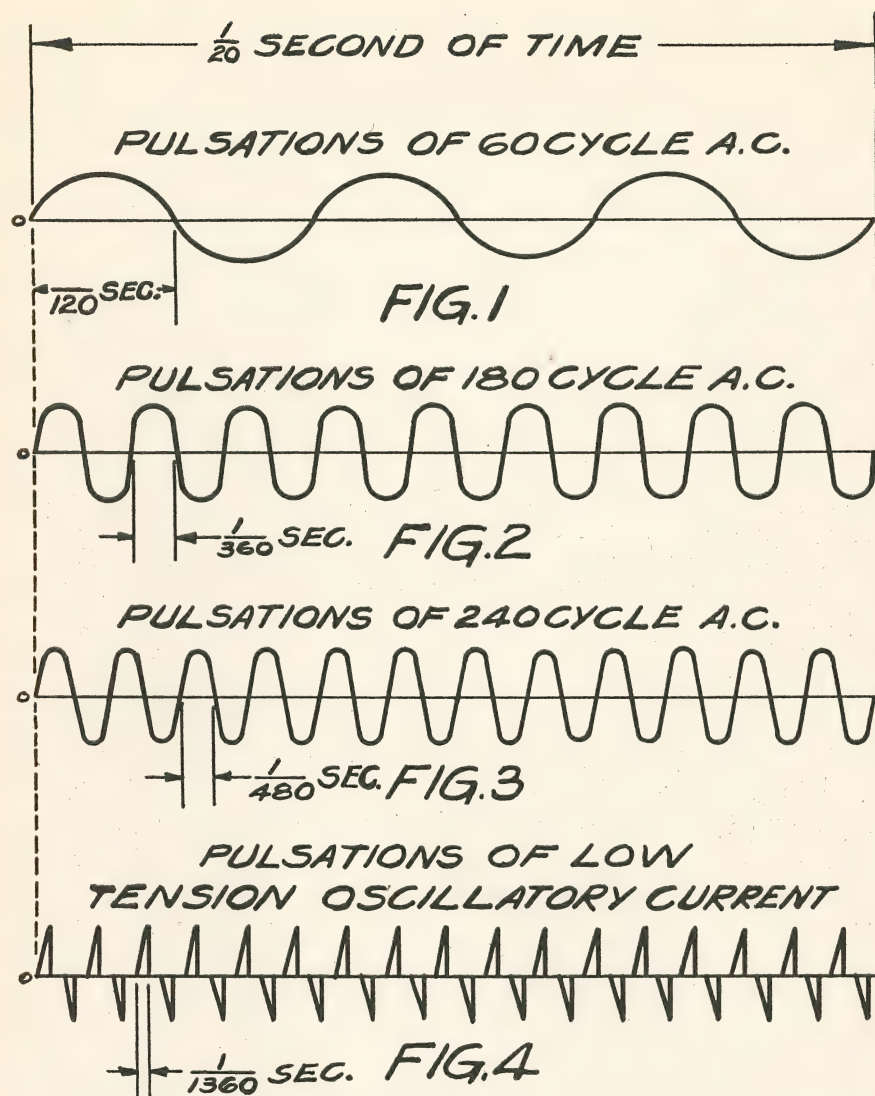
ducing mechanism, a basic current from the transformer or penetrator. The earliest Polysine Generators and other types of wave generators employed two types of basic currents, namely, Galvanic or direct current and alternating known as Rapid Sinusoidal current.

Modalities such as Nos. 3, 4 and 7 are produced by passing the galvanic or direct current through the rotor. This type of current is highly effective in producing muscular contractions, but owing to Pflueger's Law, which teaches that when an electric current is applied to a nerve, the positive pole decreases the irritability to the nerve and the negative increases the irritability, these modalities produce a certain amount of irritation in some patients, although that irritation can be modified by gradually building up the current strength during the seance.

The next group of modalities, consisting of Nos. 6, 14 and 15, is obtained by passing the Rapid Sinusoidal current through the rotor. (No. 6 is obtained by passing the combined Galvanic and Sinusoidal Current through the rotor.) On account of this type of current being alternating in character, the period of irritability or negative impulse being interrupted and replaced by a corresponding positive impulse, irritation to the skin is greatly lessened.

In other types of wave generators manufacturers have sought to still further shorten the negative impulse by employing generators producing currents of higher cyclages. One such generator delivers a basic current of 180 cycles per second, which is converted into a wave current of slow wave form. Another such generator produces a basic current of 240 cycles per second, which is converted into slow wave form. It is true that a current of 180 cycles per second, or 240 cycles per second produces a shorter negative impulse than a current of 60 cycles per second, and produces a less degree of irritability of the skin.

The Law of DuBois Reymond teaches that in the stimulation of muscle or neuron, the effect produced is proportional to the change of current intensity in the time unit. This fact is brought out in the Kobak-Bachem Chart entitled "Electric Currents."



The above illustrates the difference in change of current intensity in the time unit, between a 60-cycle current, a 180-cycle current, a 240 cycle current, and the low-tension oscillatory current as obtained from the new Polysine, each graph depicting the changes of current intensity occurring in a period of one-twentieth of a second.

Figure 1 illustrates 60-cycle current. Figure 2 depicts 180-cycle current as obtained from some wave generators. Figure 3 illustrates 240-cycle current as supplied by some wave generators; while Figure 4 shows the rate of variation of the oscillatory current.

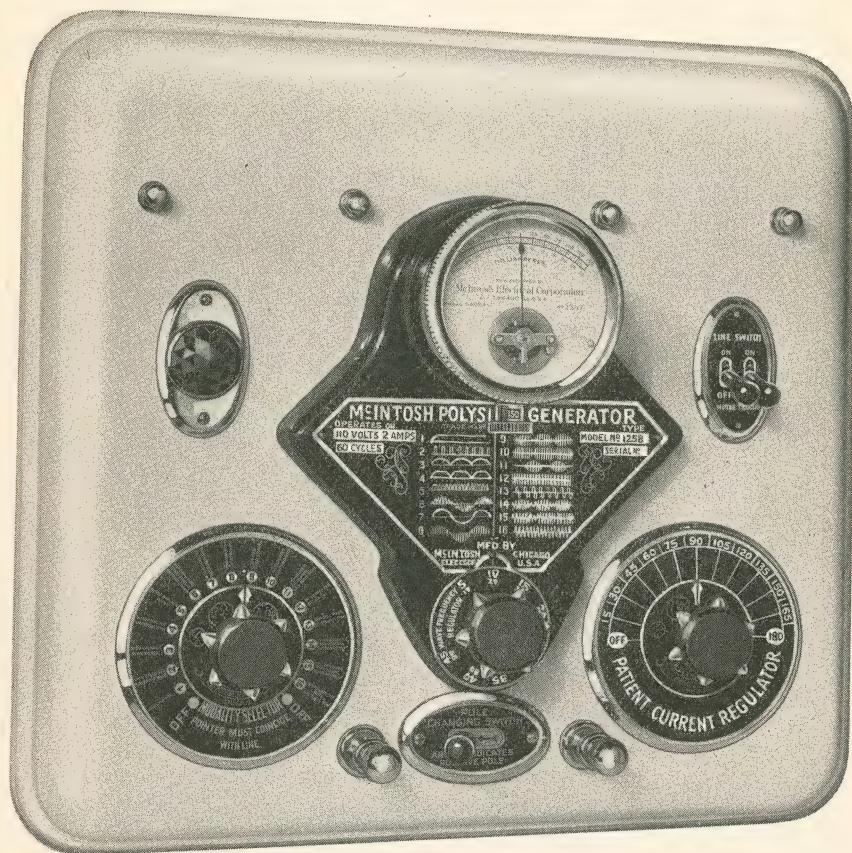
In Figure 1 the shortest impulse is $\frac{1}{120}$ th of a second; in Figure 2 the briefest impulse is $\frac{1}{360}$ th of a second; in Figure 3 the most rapid impulse is $\frac{1}{480}$ th of a second; while in Figure 4 the impulse is but $\frac{1}{1360}$ th of a second in duration. This graphically describes the superior degree of stimulation obtained with the oscillatory current.

In the new Polysine there has been embodied a device known as the Penetrator, which converts the direct current into a rapid, oscillating current by means of a commutator which changes its characteristics. Each impulse of this oscillatory current is $\frac{1}{1360}$ th of a second in duration, which is followed by a rest of equal duration, then by an impulse of equal length in the opposite direction and by another rest period of equal length, after which the cycle of events is repeated.

It will, therefore, be seen that, when the oscillatory current is compared with a 180-cycle current in which each alternation is $\frac{1}{360}$ th of a second in duration, the impulse of the oscillatory current being but $\frac{1}{1360}$ th of a second in duration is about one-fourth the length of the impulse of the 180-cycle current; consequently, according to DuBois Reymond's law, the degree of stimulation to muscle or neuron is four times as great.

Comparing the oscillatory current with a 240-cycle current in which each alternation is $\frac{1}{480}$ th of a second in duration, it will be noted that the impulse of the oscillatory current is about one-third the length of the impulse of the 240-cycle current; consequently the degree of stimulation to muscle or neuron is about three times as great.

The oscillatory current being passed through the rotor is converted into various forms of wave currents known as Modalities 8, 9, 10, and 11. With the various wave forms produced with the oscillatory current, it is possible to obtain the most intense contractions of striated or non-striated muscular fibres, with an entire absence of skin sensation. Furthermore, it is possible to produce contractions equal to those obtained from any other wave generator, with a much lower voltage, owing to the fact that the degree of stimulation, according to DuBois Reymond's Law is from three to four times as great as with any other type of wave generator. In my practice I have observed these phenomena when comparing the results obtained from various types of apparatus.



Close-Up of Control-Panel
McINTOSH POLYSINE GENERATOR
Model No. 1258

MODALITIES AVAILABLE
from
POLYSINE GENERATOR No. 1258

NO. 1. GALVANIC CURRENT

This apparatus delivers a very smooth and even Galvanic current, which is obtained from a copper-oxide rectifier, a silent and very efficient means of changing the alternating current to direct. The Galvanic current then passes to a choke coil and condensers, known as the filter circuit, where all ripples or pulsations are removed or filtered out. Because of its polar effects, the Galvanic current is indicated in ionization, electrolysis, etc. The positive pole is acid, vaso-constrictor, sedative and hardens tissue. The negative pole is alkaline, vaso-dilator, irritating and softens tissue. In ionization, a simple rule to use is to consider which part of the solution you wish to drive into the tissues, and put it on the pole corresponding to its own polarity. Some authorities consider the Galvanic to be the most useful current in Physical Therapy. It is also of great benefit in testing for nerve and muscle degeneration and in the successful treatment of such conditions.

NO. 2. INTERRUPTED GALVANIC

(10-90 INTERRUPTIONS PER MINUTE)

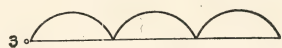
A bar chart with 8 bars, each with a height of 2 units. The y-axis is labeled '2'.

The "Motor" and "Transformer" switches must both be snapped on to obtain this modality, as well as the other modalities, except Nos. 5 and 16. A special commutator affords a "make" and "break" in the current flow, which by means of a regulator may be timed for the proper duration, thus furnishing a better regulated interruption than was obtainable from the old-style rheotomes.

Nearly all clinicians employ this current in testing for the reaction of degeneration, for if the muscle fails to respond, it means that a final diagnosis can be made.

No. 3. GALVANIC WAVE

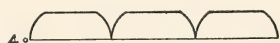
(5-45 PULSATIONS PER MINUTE)



This current is of real value in treating various types of paralysis. The Wave Frequency Regulator and the pilot light indicate the exact number of pulsations. This wave has practically the same sensation as the Galvanic Sinusoidal, but maintains its polarity or chemical properties. It is also of great value in treating adhesions with hard and indurated scars.

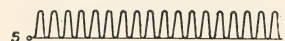
No. 4. GALVANIC WAVE SUSTAINED PEAK

(5-45 PULSATIONS PER MINUTE)



This Galvanic Current resembles No. 3, except that after the current leaves the zero line, it rises somewhat more abruptly to a peak. The current is maintained at the maximum for almost one-half phase and decreases to zero as abruptly as it rose from zero. Somewhat similar to the Interrupted Galvanic, except that it does not rise to the peak so abruptly and again there is no rest period between the waves. Its greatest value lies in intestinal atony with muscular degeneration. A very good wave current with full polarity effect.

No. 5. COMBINED GALVANIC AND SINUSOIDAL



This combines two valuable currents and gives the polarity effect of Galvanism with the tonic effect of the Rapid Sinusoidal current. Many gynecologists employ this particular modality to great advantage in female G. U. pathology, with short seances, to avoid fatigue. Many uses will be found by the practicing physician, in view of its massage and chemical action.

No. 6. SUPER-IMPOSED WAVE

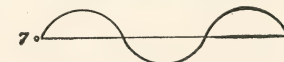
(10-90 PULSATIONS PER MINUTE)



A compound wave formed by super-imposing a rapid Sinusoidal on the Galvanic Current and retaining the valuable therapeutic properties of both. It affords deep abdominal and pelvic contractions and hence is indicated in visceral or pelvic ptosis. Excellent results may be obtained by applying the current at the seventh and eighth dorsal vertebrae. Many clinicians precede this current with diathermy to aid in breaking up and absorbing deep adhesions. This modality is also valuable in treating "Flat Foot," with one pad under each arch and each pad connected to one binding post of the Polysine.

No. 7. GALVANIC SINUSOIDAL

(10-90 PULSATIONS PER MINUTE)



This was formerly called the Slow Sinusoidal. It is an alternating or reversing Galvanic current with slight polar effects and acts favorably on unstriated muscular tissues. Neiswanger recommended it for treating paralyzed muscles and terms it "practically a perfect imitation of the natural contractions that build muscular strength. It has a marked effect upon cellular metabolism and in building up secretory function, as for example: a prostate with poor secretion." This modality was formerly widely used for the treatment of many gastro-intestinal conditions, but owing to the duration of the negative impulse, it produces considerable skin sensation, consequently it is being rapidly displaced by No. 8, Pulsating Galvanic Sinusoidal, in which sensory effect to the skin is practically eliminated. C. F. Voyles, in "Archives of Physical Therapy," recommends this modality as a mechanical exercise for atony of the colon and states that for stronger effect the Rapid Sinusoidal Wave or Super-Imposed Wave may be substituted. He states that cases have been reported in which this treatment corrected incompetency of the ileo-cecal valve.

NO. 8. PULSATING GALVANIC SINUSOIDAL

(10 TO 90 PULSATIONS)



In this modality only one-half of each oscillation produced by the Penetrator is employed, consequently the frequency of the voltage change is only one-half as great as with Modality No. 9, Oscillatory Wave; and the intensity of the impressed voltage is changed 170 times per second, while the peak voltage is on for only 1-1360th of a second, with a rest period of 3-1360ths of a second, giving muscle and nerve a slight rest between the quick, pulsating impulses, also causing the same effect and sensation as when using a mechanical vibrator. This rapid pulsation of the current eliminates all possibility of irritation by chemical action on the skin, still causing greater nerve stimulation, so deeper penetration and greater action of muscles and various organs may be obtained with less current, each pulsation acting as a sudden interruption of the Galvanic Current. The Pulsating Galvanic Sinusoidal retains the characteristics of the slow change or reversal of polarity and will cause a contraction and then a distention at each reversal, this being controlled by the Wave Controller to normal rate of contraction or muscular action of the part of body being treated. The Pulsating Galvanic Sinusoidal is especially indicated in intestinal stasis, constipation and splanchnoptosis, as well as other conditions where deep massage is indicated. This current is rapidly replacing the Galvanic Sinusoidal and Super-Imposed Wave currents.

NO. 9. OSCILLATORY WAVE

(5 TO 45 PULSATIONS)



In this modality the polarity reverses 680 times per second. Every reversal is accompanied by a rest period of the same duration as that of current closure. In other words, the current is in a positive direction for 1-1360th of a second, zero for 1-1360th of a second, in a negative direction for 1-1360th of a second and zero again

for 1-1360th of a second, when the same cycle of events begins again. This short duration, during which time the current is in a negative direction, reduces the usual irritation caused by this pole. It obtunds the nerve, producing sedation without irritation, allowing a longer period of treatment and greater volume of current.

Superimposing upon the Oscillatory current a slow wave motion, the basic current is not altered, but the current pulsations can be synchronized to conform with the natural movement of the organs with the most energetic effects and a minimum or no irritation. This modality is now being employed for practically every condition for which No. 14, Rapid Sinusoidal Wave has heretofore been used.

NO. 10. OSCILLATORY WAVE SUSTAINED PEAK

(5 TO 45 PULSATIONS)



This form of wave gives a longer, stronger pull than either 6, 8 or 9 and is to be used after the case has made considerable progress and the muscles have attained more nearly their normal tone and contractibility. Those who formerly employed Modality No. 15, the Rapid Sinusoidal Wave Sustained Peak, will find much better results with this type of wave, which has the same frequency and duration of impulse as No. 9, consequently is free from skin sensation, allowing longer treatment time, because the muscles tolerate longer contraction at the peak of each impulse, with no skin irritation. Those, who have been using Modality No. 15, will find that the same results can be had with this modality with fewer treatments.

NO. 11. INTERRUPTED OSCILLATORY WAVE

(5 TO 45 PULSATIONS)



This type of current gives the same intense nerve stimulation as No. 2, Interrupted Galvanic, without its sudden shock and skin

irritation; allowing the patient to tolerate a greater degree of stimulation than could be borne by the application of a much milder degree of interrupted Galvanic current; indicating that a larger dosage of this modality may be endured, with less irritation; therefore it is frequently of very definite use for starting a new case when pronounced stimulation and severe muscle contractions are not desired. This form of wave has the same frequency and duration of impulse as No. 9, Oscillatory Wave, and will likewise be found to be free from skin effect.

NO. 12. WAVELESS OSCILLATORY CURRENT

(TIME OF IMPULSE—I-1360TH OF A SECOND)



This modality is somewhat comparable to No. 16, Rapid Sinusoidal, excepting that it does not follow the sine wave form and its frequency is higher, while the duration of each impulse is the same as with No. 9, Oscillatory Wave. Plank recommends that this modality be used at the end of each treatment for nerve stimulation. It is also recommended in cases of hyperesthesia, where nerve fatigue is desired to relieve patient's condition, as in the case of a female with a retracted abdomen and symptoms of ovarian overstimulation with maniacal tendencies, as it is waveless and gives a mild cell massage along the course of the nerve, thus increasing its blood supply and nutrition.

NO. 13. INTERRUPTED RAPID SINUSOIDAL

(10-90 INTERRUPTIONS PER MINUTE)



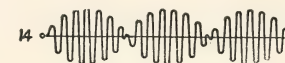
This current gives the same number of alternations as No. 16, but mechanical means are provided to interrupt the flow at definite time intervals. The period of rest prevents undue fatigue. Neiswanger recommends it in nerve degeneration. Waggoner states: "If we split the Rapid Sinusoidal Current into segments with an interrupter, we have one of the finest currents for regeneration of

nerve function." Eberhart writes: "It is a true tonic to the nerves and it is the best form of Sinusoidal current we have for regenerating impaired nerve function." This current can be used in alternation with No. 12, after a few treatments, as it gives a much deeper cell massage, not only of nerve cells, but of muscle cells as well.

C. F. Voyles, in "Archives of Physical Therapy," referring to splanchnic insufficiency, states: "Such patients usually have ptosis. The blood pressure is usually low but is higher with the patient lying down. On rising the blood pressure falls and the pulse rate increases. Vertigo and air-hunger are some of its symptoms. Physical Therapy is indicated and especially the Interrupted Rapid Sinusoidal Current. The abdominal muscles are contracted at the rate of 16 to 17 times per minute."

NO. 14. RAPID SINUSOIDAL WAVE

(5-45 PULSATIONS PER MINUTE)



This was formerly called the Surging Sinusoidal Current. It is produced by sending the Rapid Sinusoidal through the rotor, which forms and controls the "surge." It has been much used in breaking up adhesions and in the regeneration of impaired nerve function. Eberhart likens the "surge" to a string that cannot be broken by a steady pull, but is easily broken by a sudden jerk. He first employs diathermy and follows with this current. However, on account of the skin sensation accompanying the application of this form of wave, clinicians are rapidly displacing it with the No. 9, Oscillatory Wave, which possesses all of the virtues and none of the drawbacks of this type of current.

NO. 15. RAPID SINUSOIDAL WAVE SUSTAINED PEAK

(5-45 PULSATIONS PER MINUTE)



This current is the same as No. 14, Rapid Sinusoidal Wave, except the sustained peak effect. It will satisfy the physician's

every need for a very strong push and pull effect, without polarity, for the combined tonic effect on nerves and muscles. In cases of intestinal stasis and where prolapsed colon exists and a more powerful stimulant is required to stir up the sluggish musculature into action, this current can be relied upon. However, much better results may be obtained by employing No. 10, Oscillatory Wave Sustained Peak, which embodies all of the good principles of this form of wave, with many additional refinements.

NO. 16. RAPID SINUSOIDAL

(3,600 CYCLES PER MINUTE. 7,200 ALTERNATIONS PER MINUTE)



This current is obtained from the ungrounded secondary of the transformer and hence is "earth-free." It may be safely used in hydrotherapy. In view of the fact that the direction of the current is constantly reversing polarity, no chemical effects are obtained, but it is widely used for massage and promoting muscular tone. It acts favorably, due to its exercising effect, in removing the sequelae of fibrositis, but for this purpose it should be given at a point just below that necessary to produce contractibility. Neiswanger preferred it in the treatment of peripheral nerve atonicity. Waggoner uses it for massaging adhesions and deposits. Mild treatments stimulate, but heavy dosages will produce sedation through inhibition. After employing Modality No. 16, turn to No. 12, Waveless Oscillatory Current, and you will note the great improvements which have been made upon this type of current.

CAUTION: It is of the utmost importance when using Kantbern Pads, that these electrodes be thoroughly saturated with a sodium-chloride or sodium-bicarbonate solution before starting treatment.

Principles Governing the Placing of Electrodes

In the main there are two distinct types of modalities secured from the Polysine Generator and in order to understand the principles governing the placing of electrodes one should be familiar with the fundamental physics of these modalities. The following modalities have a distinct polar effect:

- No. 1. Galvanic
- No. 2. Interrupted Galvanic
- No. 3. Galvanic Wave
- No. 4. Galvanic Wave Sustained Peak
- No. 5. Combined Galvanic and Sinusoidal

In employing any of the above modalities one must be sure of the correct location of the positive and negative electrodes, because to apply the improper pole would be to defeat the object of the treatment. The important thing is the correct location of the active pole; thus for example in Cervicitis the active pole is the positive, while the indifferent pole is the negative. The indifferent pole is commonly placed on the abdomen. In the treatment of some other conditions the indifferent pole is sometimes placed at the sacrum, as it is a suitable area to contact certain nerve centers.

The following modalities, although they differ largely from each other, are all alternating in character and have no polar effect:

- No. 6. Super-Imposed Wave
- No. 7. Galvanic Sinusoidal
- No. 8. Pulsating Galvanic Sinusoidal
- No. 9. Oscillatory Wave
- No. 10. Oscillatory Wave Sustained Peak
- No. 11. Interrupted Oscillatory Wave
- No. 12. Waveless Oscillatory Current
- No. 13. Interrupted Rapid Sinusoidal

- No. 14. Rapid Sinusoidal Wave
- No. 15. Rapid Sinusoidal Wave Sustained Peak
- No. 16. Rapid Sinusoidal

These modalities have no polar action and the principal use for which they are employed is to produce muscular contraction or nerve stimulation. In the application of these currents the location of the active electrode is of great importance, but the location of the indifferent electrode is of secondary importance, the only object to be gained being to locate the electrode so that the current concentrated at the active pole will traverse the muscle or nerve trunk to be treated.

In the employment of many of these modalities to spinal nerve centers it is quite common practice to place two small electrodes 2" x 3" in the same spinal area, as for example in Splanchnoptosis; both electrodes are placed at the seventh and eighth dorsal vertebrae, one electrode being placed on one side of the spinous processes and the other electrode on the opposite side, so as to engage the nerve centers through the foramina.

In some cases, as in the contraction of the gall bladder a large indifferent pad is placed over the sacrum and a smaller active electrode 2" x 3" is placed over the fifth and sixth dorsal vertebrae on the right side. As of course, there is no polar effect to the current, it is a matter of indifference as to which terminal is connected to the sacrum or which is applied to the dorsal area.

A careful study of the properties of the various modalities will enable one to place electrodes accurately and intelligently. In cases where an author fails to mention the location of the indifferent electrode one can use one's own judgment as to the placing of same, as long as the above principles are borne in mind.

Manual of Technique

ACHONDROPLASIA

SYNONYMS—Fetal Rickets. Dwarfism.

ETIOLOGY—Unknown. Arrest of growth. Premature union of epiphysal cartilages of long bones. Shortness of extremities, normal growth of head and trunk. Retracted nose, fingers and toes equal length.

TREATMENT—Careful infant feeding. Daily massage. Daily light therapy; Biolite (infra-red energy), 15 minutes front and back, whole body. Ultra-violet energy front and back, one minute at 40 inches. Increase one minute a day. Decrease distance of light one inch each day, down to 15 inches and six minutes of time. Two weeks after the inauguration of the light therapy treatment, begin to apply electricity as in Poliomyelitis, for reaction of degeneration. Treat the weaker muscles with negative Galvanism, very carefully, with low milliamperage, three to five, every three days. As case improves, increase to daily treatments. Give No. 8, Pulsating Galvanic-Sinusoidal, mild at first, up to tolerance of the patient with 10 to 15 contractions. Pituitary and thyroid substance, internally.

ACIDOSIS

SYNONYMS—Acid Intoxication. Hyperacidity. Hypoalkalinity.

ETIOLOGY—Diabetes Mellitus. Starvation. Non-carbohydrate diet. Too much meat, fats, sweets, etc. Overeating. Toxic poison. Long illness. Infectious diseases. Severe burns.

TREATMENT—Alkalinization. Stimulate pancreas as in gastric ulcer, 2" x 3" pad over tenth dorsal, left side; 2" x 3" pad over fifth and sixth dorsal, right side. No. 8, Pulsating Galvanic-Sinusoidal, to produce 8 to 15 mild contractions per minute; then increase to patient's comfortable tolerance, 5 to 15

GLEANINGS OF LOW VOLTAGE TECHNIQUE

minutes. Ultra-violet energy in graded doses, one minute first day, increasing one minute each time, as in any body radiation with air-cooled lamp, with the usual internal alkaline medication.

ACNE

SYNONYMS—Pimpley face.

ETIOLOGY—Acne bacillus. Malnutrition, rich foods, fats and sweets, acid foods.

TREATMENT—Biolite, heat, hot packs, alcohol, Oudin spark, negative (mild) Galvanism, active pad to face, two to three M. A. Indifferent pad over seventh cervical region. Acne vaccine. Regulate diet.

ACROPARESTHESIA

SYNONYMS—Numbness of extremities.

ETIOLOGY—Over-use of hands in too much cold water, alcohol or gasoline. Too much tea, coffee and tobacco. Sexual disturbances. Gastro-intestinal diseases. Arteriosclerosis. Tabes. Cerebro-spinal Syphilis.

TREATMENT—Negative No. 3, Galvanic Wave to hands and different areas of arm and forearm. Positive Galvanism to brachial plexus. Use 2" x 3" pads (patient's comfortable tolerance) for 15 minutes, followed with No. 8, Pulsating Galvanic Sinusoidal from hand to hand, as above, 10 to 15 contractions with either current. Internal medication: Iron and arsenic, K. I., etc.

ADHESIONS

SYNONYMS—Abnormal joining of tissue.

ETIOLOGY—Pelvic, Thoracic and Abdominal Inflammations. Pus tubes. Endometritis, etc. Gonorrhea. Syphilis.

GLEANINGS OF LOW VOLTAGE TECHNIQUE

TREATMENT—See page 46, Eberhart. Diathermy or Biolite to abdomen. Polysine No. 8, Pulsating Galvanic Sinusoidal to seventh and eighth dorsal vertebrae. Use 2" x 3" pads, 10 to 12 contractions per minute (patient's tolerance), 15 to 20 minutes. Repeat every other day for one week, then twice a week for three months to two years.

ADIPOSIS DOLOROSA

SYNONYMS—Dercum's Disease. Paratrophy. Painful fatty tumors in arms, legs and body at or after menopause. Never on hands, face or feet.

ETIOLOGY—Ovarian insufficiency in highly nervous women.

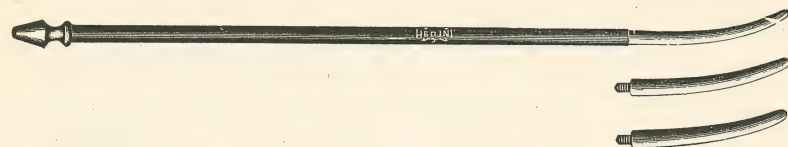
TREATMENT—Polysine. No. 8, Pulsating Galvanic Sinusoidal over fourth and fifth lumbar vertebrae (patient's tolerance), 15 to 20 minutes, 20 to 30 contractions. Use the 2" x 3" pads. Internal treatment: Ovarian substance, corpus luteum. Mixed glands also hypodermically. If associated with impotency, use Biolite to the abdomen. Mercury-vapor Quartz lamp, air or water cooled, through vaginal tube, two minutes to each side of vaginal vaults, deep. Increase one minute each treatment, up to six minutes on alternate days. Results *wonderful*, as a rule.

AMENORRHEA

SYNONYMS—Delayed period. No menses. No flow.

ETIOLOGY—Cervical stenosis. Infantile uterus. Obstruction. Colds. Worry. (Not including pregnancy.)

TREATMENT—Biolite 15 minutes to abdomen and back. Negative Galvanism to cervical canal. Uterine copper electrode, one that fits the canal snugly, 5 to 15 M. A., 15 minutes with a positive pad 4" x 6" suprapubically. Follow with No. 12,



No. 6117. Intra-Uterine Electrode (Goelet's)

Waveless Oscillatory Current, for mild cellular massage, also nerve stimulation, for 15 minutes, using two 2" x 3" pads, 4th to 5th lumbar vertebrae, volts (patient's tolerance) 15 minutes. Neiswanger recommended negative Galvanism, applied with the copper ball vaginal electrode. He gave up to 40 milliamperes for 10 minutes, every other day.

ANAL FISSURE

SYNONYM—Ulcerated Anus.

ETIOLOGY—Proctitis, Constipation, Tear from hard fecal matter, T. B., Syphilis, Gonorrhea.

TREATMENT—Positive Galvanism with copper wire electrode covered with cotton soaked in copper sulphate 1% solution, 3" x 5" pad under patient's abdomen, 5 to 15 milliamperes for 10 to 15 minutes. Ultra-violet radiation with compression quartz applicator. Complete rectal divulsion under general anesthetic.

ANGINA PECTORIS

SYNONYMS—Heart pain, breast pang, sternalgia, sternodynia.

ETIOLOGY—Syphilis, Arterio Sclerosis, Worry, Overwork, Exposure, Excessive Meat Diet, Alcoholism and Metallic Poisoning.

TREATMENT—Diathermy treatment of Block Tin or Huth Metal electrodes over heart about 3" x 5", and 5" x 6" on back; not over 500 milliamperes for 10 to 15 minutes. Positive Galvanism at 2nd, 3rd and 4th Cervical Nerve with 2" x 3" pad on left side of spine. Negative 2" x 3" pad in left hand. Patient's comfortable tolerance. Usual internal medication such as Amyl Nitrite, etc.

ANKYLOSIS

SYNONYMS—Locked joint. Stiff joint.

ETIOLOGY—Fractures. Arthritis. Traumatism. Gonorrhea.

TREATMENT—(Eberhart) Diathermy for 30 minutes to thoroughly heat the area, followed immediately with Polysine, No. 9, Oscillatory Wave, or No. 14, Rapid Sinusoidal Wave 20 to 30 contractions for 15 minutes with current of sufficient strength to produce muscular action. Place one pad on each side of joint, alternating with one pad on top and one below, also if ankle joint, place one pad on sole of foot, other pad over instep, using 2" x 3" pads. Treat 3 times per week.

APOPLEXY

SYNONYMS—Cerebral or Spinal Hemorrhage. Paralysis. Stroke.

ETIOLOGY—Arterio-sclerosis. Sudden mental stress. Rupture of miliary aneurysm. General paresis. Obesity. Chronic nephritis. Auto-intoxication. Hypertension. Debility.

TREATMENT—Quiet, until after hemorrhage is stopped, which is about two weeks. Apply diathermy through the brain, not over 500 milliamperes, 15 minutes a day to absorb the clot. Polysine No. 8, Pulsating Galvanic Sinusoidal, 2" x 3" pad to brachial plexus and hand. Start with mild treatments, gradually increasing from day to day (patient's tolerance), 10 pulsations, 15 minutes daily. Same treatment can be given to the leg from lumbar vertebrae to foot. This is for paralysis following the stroke.

APPENDICITIS (Chronic)

SYNONYMS—Inflammation of the appendix. Typhlitis and Paratyphlitis.

ETIOLOGY—Infection. Traumatism. Adhesions. Enteroptosis. Clonic spasm of the Cecum.

TREATMENT—Rest, diet, careful catharsis and enemas. Diathermy through McBurney's point, 4" x 6" block tin or Huth Metal

electrode on the back, skin well-soaped, an oval of block tin or Huth Metal 3" x 4" across, or a piece of mesh folded to same size, placed over McBurney's point. Give 900 milliamperes, 15 to 20 minutes. Follow with Polysine No. 8, Pulsating Galvanic Sinusoidal, both 2" x 3" pads to fourth and fifth lumbar vertebrae, or one 2" x 3" pad over McBurney's point, 8 to 10 contractions per minute (patient's tolerance), or enough to cause contraction, 15 minutes. Repeat on alternating days.

APTYALISM

SYNONYMS—Hypoptyalism. Dry mouth. No saliva.

ETIOLOGY—Fright. Excitement. Temporal lobe tumors. Convalescence from typhoid fever. Atrophy of salivary glands.

TREATMENT—Usual medical glycerine sprays, mouth washes containing lemon juice, glycerine and peppermint water, pilocarpine internally or hypodermically. Negative galvanism up to 5 milliamperes for 15 minutes to the glands. Positive pole can be placed on chest or back. Pads, spongio disc to the glands, 4" x 6" to the back or chest.

ARTERIO SCLEROSIS

SYNONYMS—Hardening of the arteries. Pipestem arteries.

ETIOLOGY—Advanced age. Mental stress and strain. Worry. Habitual overeating. Syphilis. Chronic intoxication. Auto-intoxication. Gastro-enteroptosis. Fast living.

TREATMENT—Rest. Quiet life. Strict diet. Regulate the bowels. Auto-condensation 600 milliamperes, 12 minutes. These cases should be started with Tesla or Oudin auto-condensation, so as not to set up too much elimination and re-absorption, which would be bad for the patient. After patient has become used to elimination from the Tesla current, then the d'Arsonval current can be used. Polysine No. 8, Pulsating Galvanic Sinusoidal, two 2" x 3" pads to 7th and 8th dorsal vertebrae, 10 to 12 contractions per minute, 15 to 20 minutes, to patient's comfortable tolerance, to overcome gastro-enteroptosis.

ARTHRITIS

SYNONYMS—Rheumatism of joints. Joint inflammation.

ETIOLOGY—Focal infection, either teeth, gout, tonsils or sinuses, gonorrhea, or intestinal infection.

TREATMENT—Cumberbatch recommends Galvanism, employing negative pole to the joints with the positive to some other portion of the limb. If there is much pain and tenderness, the polarity may be reversed. Treat 20 minutes on alternate days. If there is not too severe skin reaction from preceding treatment, follow with No. 12, Waveless Oscillatory Current, for cell massage and to increase blood supply and nutrition. Diathermy at least 2000 M. A., 45 minutes daily. Intravenous Sodium Iodide, Sodium Salicylate, Sodium cacodylate.

ASTHMA

SYNONYMS—Paroxysmal dyspnea.

ETIOLOGY—Foreign proteins, pollens and infection. Chronic rhinitis and sensitive nasal mucous membrane. Chemical gases, dust.

TREATMENT—Diathermy through the chest. Follow with positive galvanism to nasal cavities, 3" x 5" negative pad on back. Pack nostril with cotton soaked with 1/2 of one per cent zinc sulphate, not over 5 milliamperes for 15 minutes. Can also use adrenalin, 1 to 10,000 in the nose on the cotton applicator, with positive Galvanism. Same amperage. Hypodermically subcutaneously Lloyd's lobelia; also the new endocrine product made from pancreas.

ATAXIA, Locomotor

SYNONYMS—Tabes dorsalis. Posterior spinal sclerosis.

ETIOLOGY—Usually Syphilis.

TREATMENT—Anti-syphilitic. Climate. Rest, etc. Diathermy to the spine. Static wave to spine. Polysine No. 8, Pulsating Galvanic Sinusoidal, also No. 10, Oscillatory Wave Sustained

Peak, 2" x 3" pads to upper and lower spine, also same pads to each foot, to patient's comfortable tolerance, 15 to 20 minutes, 15 contractions per minute. For crises of stomach, give luminal.

ATROPHY (Progressive Muscular)

SYNONYMS—Wasting palsy, poliomyelitis anterior, muscular wasting.

ETIOLOGY—Early degeneration of motor nervous system and muscles. Cold and wet. Traumatism, fright, worry and lead poisoning.

TREATMENT—Fresh air day and night. Plain, easily digested foods. Moderate exercise. Avoid fatigue. Moderate massage. Galvanism, 5 minutes daily. Ferro-arsen intravenously. Polysine No. 5, Combined Galvanic and Sinusoidal, to patient's comfortable tolerance, placing indifferent pad to shoulder or sacrum, the active pad to motor point or belly of muscle involved. Follow with No. 8, Pulsating Galvanic Sinusoidal over same area with 8 to 10 contractions per minute to patient's tolerance for 5 to 15 minutes.

BED SORES

SYNONYMS—Decubitus, ulcers.

ETIOLOGY—Wasting diseases. Lying too long in one position.

TREATMENT—Cleanliness. Change position often. Dusting powders. Test ulcer for acidity or alkalinity. For acid ulcers use negative Galvanism, one or two milliamperes, 5 to 20 minutes. Cover active pad with cellucotton, moistened with saline solution. For alkaline ulcer use positive pole with metallic salts—Zinc sulphate, copper sulphate, etc.

BELL'S PALSY

SYNONYMS—Facial Paralysis.

ETIOLOGY—Exposure to cold or draughts when fatigued. Disease of fifth nerve. Lesions of Gasserian Ganglion.

TREATMENT—Galvanism, No. 3, Galvanic Wave (Eberhart) 3" x 5" pad over lower part of neck or at sacrum. Negative spongio disc, 2 inch, over motor points to muscles of face, eye, cheek and angle of mouth. Negative pad to motor points, 2 to 5 milliamperes, six contractions to each muscle for first few treatments, increasing as improvement develops.



Treatment of Bell's Palsy. A complete restoration is often accomplished within a month, using the technique given herewith

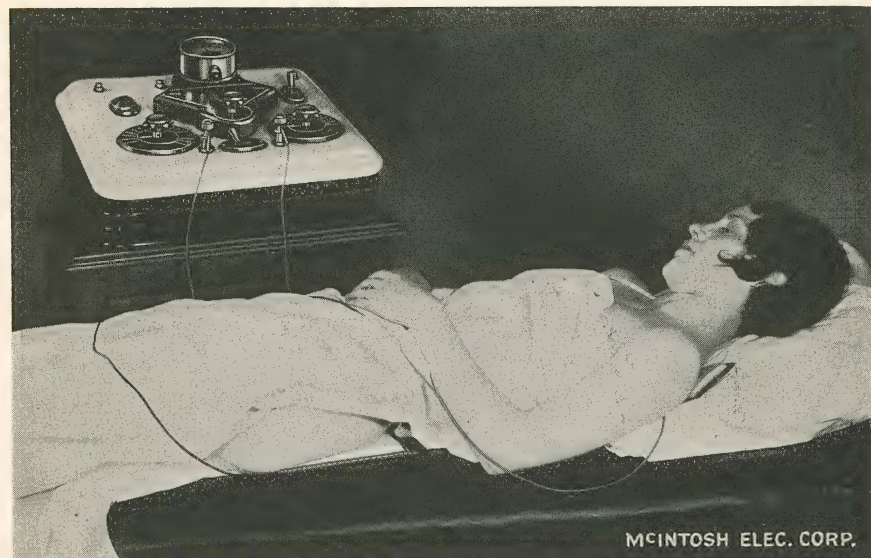
No. 12, Waveless Oscillatory current, to patient's comfortable tolerance, 10 to 15 minutes, for cell massage, to increase blood supply and nutrition. After improvement, No. 8, Pulsating Galvanic Sinusoidal should be used for greater improvement. 6 to 10 mild contractions for 5 to 15 minutes.

BRACHIAL NEURITIS

SYNONYMS—Neck neuralgia.

ETIOLOGY—Exposure to cold and wet. Washing hair. Draughts. Injury to shoulder. Carrying heavy loads on shoulder. Traumatism.

TREATMENT—Place 2" x 3" pad over the brachial plexus and a 4" x 6" pad over the sacrum.



In Brachial Neuritis the Waveless Oscillatory current will soon inhibit the pain and quickly bring relief

Turn on current to patient's comfortable toleration and continue for 20 to 30 minutes, gradually increasing current, using No. 12, Waveless Oscillatory Current. This will inhibit the pain and bring relief. Repeat as necessary. (Ireland.) If pain extends to arm or forearm, place the larger pad under hand, forearm or arm, instead of sacrum.

BRACHIAL PLEXUS PARALYSIS

SYNONYMS—Arm paralysis.

ETIOLOGY—Traumatism at birth. Other traumatism. Abscess compression. Cervical rib. Neuritis.

TREATMENT—Place 2" x 3" active negative pad laterally, 1 inch back of sternomastoid muscle, and one inch above clavicle. Positive pad 3" x 5" to hand, arm or forearm, using No. 4, Galvanic Wave Sustained Peak, 10 contractions, to patient's comfortable tolerance, 10 minutes, affording the combined chemical action of galvanism and the stimulation of wave current.

BULBAR PARALYSIS

SYNONYMS—Glosso-labial laryngeal paralysis. Dribbling.

ETIOLOGY—Traumatism. Focal infection, teeth, tonsils or sinuses. Electric shock. Hemorrhage. Embolism.

TREATMENT—Place 2" x 3" negative pad at base of skull, 3" x 5" pad on arm or shoulder. Give No. 4, Galvanic Wave Sustained Peak, 5 minutes, gently, about 3 to 4 milliamperes.

CERVICAL CATARRH (Neiswanger)

SYNONYMS—Leucorrhea. Whites. Inflammation. Female weakness.

ETIOLOGY—Lacerations of cervix. Inflammation. Gonorrheal Infection. Pessaries to prevent conception. Ovarian Insufficiency. Constipation. Sexual Excess. Pelvic Infections and congestions. Adhesions. Uterine infections and inflammation.

TREATMENT—Place a copper intra-uterine electrode within the cervical canal, one that will well fill the canal. Attach it to the positive terminal. Place a 4" x 6" pad over the abdomen, suprapubically. See that the intra-uterine electrode is passed well up to the internal cervical os. Give a strong current, from 15 to 20 milliamperes for 20 minutes. Do not move or rotate the electrode to prevent sticking, for that is just what you want. In five minutes the instrument will stick tight, but can be withdrawn by a little traction, when you will discover that the albuminous plug has been coagulated by the acid action of the positive pole and has adhered to the electrode. Some bleeding may follow, but it is of no consequence. If the canal is examined now you will find the cervical glands denuded clear down to the nabothian glands. You have, in fact, curetted the cervical canal, but with little inconvenience to the patient, and have deposited copper salts through the cervical region, which will destroy germs exerting their influence there. One or two more applications may be necessary,

but each time the exudate will be less in evidence, and you will have done more in a single seance than could possibly be done even by a surgical curettement. Another good treatment is to coagulate by diathermy, using the Remington cervical Electrodes. It is very simple and very effective.

CERVICAL EROSIONS (Eberhart)

SYNONYMS—Raspberry cervix. Boggy cervix. Eroded cervix.

ETIOLOGY—Lacerations. Subinvolution. Mal-position of uterus. Long standing infections and inflammations of cervical canal. Chronic gonorrhea. Injuries, etc.

TREATMENT—A satisfactory way to treat these cases is with the Neiswanger bag electrode attached to the positive pole of the Galvanic current, with or without diathermy or Biolite in conjunction, using same technique as in leucorrhea. The bag holds about 100 c.c. of fluid. You may use either copper or zinc sulphate ($\frac{1}{2}$ of 1%) in solution. Preferably use copper sulphate solution and put in just enough of the copper sulphate to give the hot water a distinct greenish color.

The electrode is introduced in the collapsed form and then filled with the solution, which either may be put in through a good sized syringe, or by attaching the irrigator tube to end of electrode. A towel around the electrode and anchored by a sand bag which holds the negative pad on the abdomen, will keep the end of the electrode from dropping down and spilling the solution; or place a clamp or hemostat on tube. In putting the bag on the electrode there should be left about one inch between the rubber tubing and end of the bag, otherwise there will be too much pressure at this point. Also, when distended with solution, a small part of bag should extend outside of the vulva, so that Bartholin's glands and ducts, which are favored sites of infection, may also receive the benefit of the treatment. Twenty milliamperes for 20 minutes is the average dose. In case of severe conditions or those of definite specific origin, the time should be greatly in-

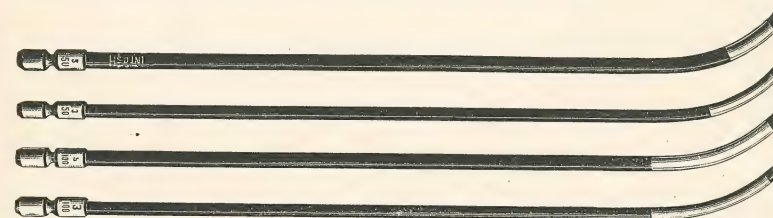
creased, sometimes as long as an hour. This electrode is ideal for those vaginal conditions, because it fits more closely to the vaginal walls than any metal electrode and because the distension stretches out the little rugae, or folds, in the vagina.

CERVICITIS & ENDOMETRITIS (Eberhart)

SYNONYMS—Trachelitis and uterine inflammation (cervical and corporeal).

ETIOLOGY—Infections, Gonorrheal, Abortions, Sexual Abuse, Lacerations, Constipation.

TREATMENT—Many of these cases respond nicely to diathermy alone, through the vagina, but the more severe ones require the employment of Galvanism, and if only one method were available, the Galvanic would be preferable.



No. 6099. Uterine Copper Electrodes

The treatment for both cervicitis and endometritis is the use of the positive pole of the Galvanic current, with a copper or zinc electrode, in order to drive into the mucous membrane, the oxychloride of copper or zinc, for the purpose of getting at the cause of the trouble. This is copper or zinc ionization.

For years we have used copper tipped electrodes (see cut) which come in graduated sizes. More recently zinc tipped electrodes have been made in similar style, because some believe that zinc is a better germicidal agent than copper. The patient is placed on her back with feet in the stirrups, in a comfortable position and the ordinary metal speculum employed. The negative pole is a good sized pad placed on the abdomen, after having been soaked in warm water. It is held in place with a sand bag. The positive copper or zinc electrode is now

introduced into the cervical canal, and the current slowly turned on 10, 12, 14 or more milliamperes, according to the tolerance of the patient. The treatment will last 15 to 30 minutes. The current is then turned off, but when you attempt to remove the electrode, you will find that it is held fast, owing to the contracting effect of positive Galvanism. Instead of forcibly pulling out the electrode, turn rheostat off, reverse the current or polarity, making this electrode temporarily a negative one, and turn the current on for 30 to 60 seconds or more, when the dilating and relaxing action of negative Galvanism will release the electrode.

After a few treatments the drying effect of the current will reduce the discharge to a small amount. When it gets to be comparatively insignificant in quantity, it is advisable to give a few treatments, using the same electrode connected to the negative pole, to get the effect of neutralizing the acid reaction by the alkaline effect of the negative pole. This also liquefies the slight amount of remaining discharge and the case is essentially cured. In cases with a large, boggy uterus, other treatment will be needed, such as muscular stimulation. Give No. 8, Pulsating Galvanic Sinusoidal with the intra-uterine copper electrode. The author prefers an insulated tipped electrode, so as not to get the maximum of current on the tip of the electrode. Place a 4" x 6" well soaked pad over the abdomen, suprapubically. Give as strong a current as the patient can stand comfortably. Another way, and possibly better in results, would be to place a 2" x 3" pad well soaked, under the 12th dorsal vertebra (reflex center for uterus). Some prefer 4th and 5th lumbar vertebrae, but at this area you get more action on ovaries. Still another mode is to place the 2" x 3" pad on or under 12th dorsal vertebra and the 4" x 6" pad under sacrum. This treatment can be given in either of two positions of patient, prone on her back or on her abdomen. The author believes it works best with the patient on her abdomen. The current should be turned on gradually until you notice a drawing in of the buttocks toward

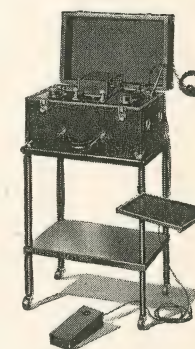
the centre of fold. Give 15 contractions a minute for 15 to 20 minutes, to the comfortable tolerance of the patient.

CHRONIC ENDOCERVICITIS (Remington)

TREATMENT: *The Remington Localized Biterminal Cervical Coagulating Method.* This method is best accomplished by means of a good coagulating unit and a set of specially devised electrodes. The McIntosh Metro-Coagulator is the most efficient coagulating apparatus. This device affords measured coagulation currents (d'Arsonval type) with twelve fixed points of power suitable for light, medium, and heavy coagulation, covering the entire field of surgical diathermy, including coagulation, fulguration, and desiccation for hospital and office requirements. It is fool-proof, accurately calibrated for such technique, gives just the right amount and type of current, eliminates guess-work and the danger of over-coagulation, and saves time.

Other diathermy units providing a true d'Arsonval current may be used, but one must make sure that the spark gap is set for the correct and most efficient milliamperage.

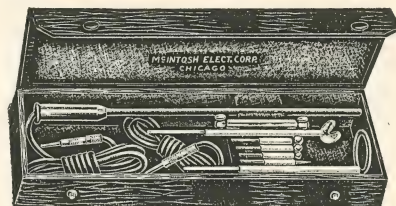
The author has developed a set of electrodes to be used in his cervical coagulation technique for chronic endocervicitis and other cervical conditions. These instruments result from a real need of electrodes especially adapted to the anatomical structure of the vagina, cervical lips, and cervical canal. While most cervical electrodes are so designed that they only coagulate the canal and cannot be used for coagulating and sparking the cervical lips—the flexibility of design of the Remington electrodes permits their use in every phase of cervical coagulation, fulguration and desiccation in other



No. 8660. McIntosh Metro-Coagulator

vaginal, cervical and rectal conditions where such technique is indicated and regularly employed.

With the McIntosh Metro-Coagulator, the voltage selector switch is set at Point 1 (2,200 milliamperes) for the small ball-tipped electrode; Point 2 (3,200 milliamperes) for the medium-sized ball-tipped electrode; and at Point 3 (3,750 milliamperes) for the large ball-tipped electrode. This range of milliamperage does not



No. 8544. Remington Cervical Coagulation Set

apply to any other unit but the Metro-Coagulator. All other diathermy units should be used with a less milliamperage because the above range would be very powerful and coagulate too deeply into the muscular area, producing scar tissue and stenosis, with possibly an atresia of the cervical canal. The range on these other diathermy units should be as follows: 750 to 1,250 milliamperes for the small ball-tipped electrode; 1,600 milliamperes to 1,800 milliamperes for the medium ball-tipped electrode; and 2,000 to 2,200 milliamperes for the large ball-tipped electrode. *All milliamperes above mentioned, both for the Metro-Coagulator and other diathermy units, are based on a meter registration by a dead short of the electrodes.*

The Remington electrodes are provided in a combination known as the REMINGTON CERVICAL COAGULATION SET, and the technique is properly referred to as the Remington Localized Biterminal Cervical Coagulation Method. This technique is performed as follows:

The indifferent applicators or electrodes are of two types. One consists of a metal disc placed at an angle of 45° on the end of a metal shaft. The disc has a cut-out space or notch on the superior edge to conform with the shape of the cervix. The inferior edge is flat to avoid pressure on the floor of the vagina. The disc measures $11/16$ inch across, $10/16$ inch from

superior to inferior edges, $5/16$ inch from lowest level of cervical notch to inferior edge. The shaft is insulated from the disc to its connection in the double-connection, indifferent electrode handle. This insulation prevents any leakage of current to speculum and provides a constant current strength at the end of the active electrode. The size and shape of the disc also answers the purpose of a uterine elevator. The other type of indifferent electrode is known as the ring applicator, consisting of a metal ring $1-7/16$ inch in diameter, placed on edge at one end of a metal shaft at a 90° angle. This ring is rather large, but can be passed through a bi-valve speculum by a little manipulating. It is used in cases where the lacerations are long and the cervical lips very large. The shaft of this electrode, as in the case of the disc applicator, is also insulated.

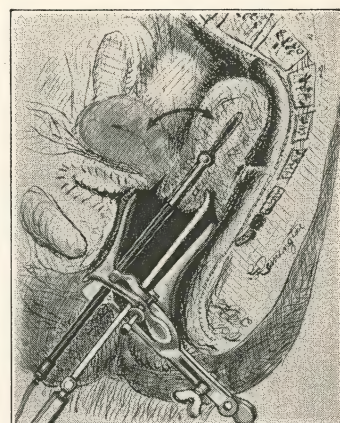
The active electrodes consist of a sharp or pointed shaft, and three with ball ends of graduated size, each $2-2/16$ inches long and fit in a special, long, insulated handle $11-4/16$ inches in length. This extra length facilitates working within the vagina without obstruction of view.

Preparation. Patient placed on table in dorsal recumbent position, feet elevated in stirrups, buttocks well down to edge of table. A large, bi-valve, vaginal speculum inserted and adjusted to bring cervix into good position and good vision.

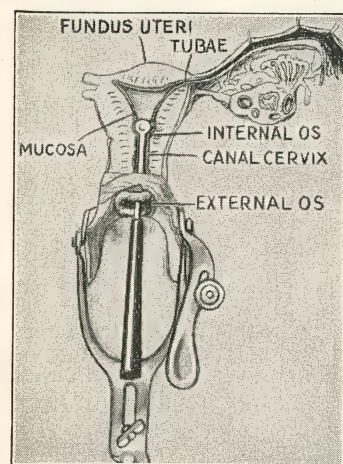
Procedure. The disc applicator is inserted laterally and slid under anterior lip, thus elevating cervix. The ball-tipped electrode is then inserted within the cervical canal up the internal os, both electrodes are connected to terminals of the fixed-point coagulating unit and the current selector switch placed at point 2 or 3 to provide a long, hot spark.

The operator now steps on the foot switch and at the same time slowly withdraws the applicator with a light upward pressure, to completely cover the roof of the canal; he allows not over 4 seconds time for the withdrawal, or just

enough to prevent any unnecessary cramping within the uterine cavity. This operation is repeated four times, making light pressure each time in four different areas, the first time on the roof or superior wall of the canal; second, the right, lateral wall; third, the floor or inferior wall; and fourth, on the left lateral wall, or vice versa, also placing the indifferent disc electrode each time on the same side of cervix that pressure is made, so that the operator is always pressing toward the disc during withdrawal of the ball-tipped electrode. When the ball reaches the middle area of the canal, increase the pressure a



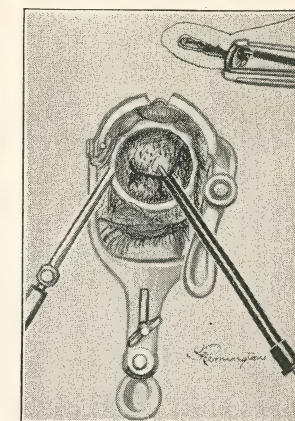
Showing retroversion of cervix by indifferent disc electrode applied at base of posterior cervical lip through bi-valve speculum, and application of ball-point active coagulating electrode inserted through cervical canal to internal os, ready for withdrawal, coagulating as per technique



Diagrammatic longitudinal section of uterus and cervical canal, ventral view, indicating depth to which ball-point electrode should be inserted in following cervical coagulation technique

little, as from here out the folds or rugae are larger and deeper and an increase of pressure smooths out the folds. After coagulation of canal has been completed the disc is withdrawn and the ring applicator is inserted by holding the shaft straight up over the Mons Veneris, moving hand to patient's left inguinal region then raising and at the same time pressing down the ring (as in passing a sound in the penis), and it will slide in and around the cervix and fit snugly. Place the sharp electrode in the long handle, turn switch to point 1, step on the foot

switch and coagulate all tissue within the ring by sinking the sharp point of the active electrode into the tissue to a depth of $\frac{1}{8}$ " to $\frac{1}{4}$ ", taking first the posterior lip and later the anterior lip. If tissue adheres to the needle the milliamperage is too high and you are carbonizing the tissue. The way to remedy this is to lower the milliamperage. This is done on the Metro-Coagulator by cutting out one spark gap. On other diathermy units, much lower milliamperage is advised—approximately 750 milliamperes to 1,250 milliamperes.

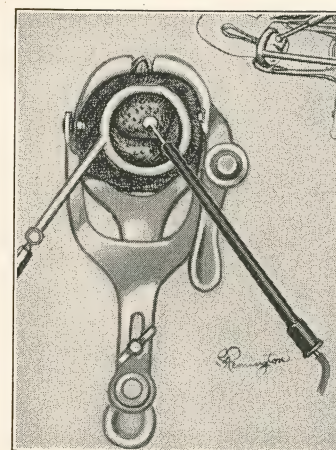


Showing indifferent ring electrode in situ through bi-valve speculum with needle electrode inserted into external cervical tissue for coagulating area within ring, including anterior and posterior lips

Follow the above technique with a good swabbing of iodine and phenol.

For the first treatment it would be best to first coagulate the canal and part of the posterior lip or as much as the patient can stand without much discomfort. The degree of sensitiveness varies with patients. The author does not use any local anesthetic in these cases.

In the greater number of large, boggy, lacerated cervixes, the external os will be a large, irregular opening—almost round—instead of a horizontal slit.



Showing indifferent ring electrode in situ inserted through bi-valve speculum with ball-point active electrode as applied in fulguration sparking of anterior and posterior cervical lips

This is where the ball-tipped electrode is best adapted, as it gets into all the folds or rugae and no tissue escapes treatment.

One should not forget that the folds or rugae in the outer two-thirds of the cervical canal are larger and deeper and require a little more pressure than in the internal os. Also remember that too long a spark with too high a milliamperage will coagulate too deeply. The cervical glands are easily destroyed by a coagulation depth of one millimeter or one thirty-second of an inch. It is not necessary to see the white coagulated tissue in the canal to be sure you have coagulated deeply enough. Do not try to coagulate a cervical canal with a complication of infected or inflamed appendages or a uterus with fibroids, for these cases always complain of the most pain.

It is impossible to do a complete coagulation in one seance. I find that the average case requires from 3 to 6 treatments to get a good, clean cervix.

CHLOROSIS (Remington)

SYNONYMS—Green sickness. Young women's decline. Pubertic anemia.

ETIOLOGY—Lack of fresh air and exercise. Poor food. Long courtships. Masturbation. Virginal sexual excitement.

TREATMENT—Rest, sunshine, good clean food, exercise in the out-of-doors. Marriage. In these cases you will find a hypergonadal condition, due to the over-stimulation of the reproductive organs from the close contact of the opposite sex. While the intentions of each party may be the best, the young lady, knowingly or unknowingly, is worked to a very high nervous condition. Advise the family to let the young couple get married and tell them they can look for a change within three weeks. The girl will put on 15 pounds of weight, and all the nervous symptoms will disappear. In case the parents refuse marriage, then other means for a cure must be sought. Use No. 16, Rapid Sinusoidal or No. 12, Waveless Oscillatory Current, the latter because it does not produce any sting under

applicators or pads. These currents produce sedation and inhibition of nerves, as well as nerve cell stimulation.

Place two 2" x 3" pads, well soaked, one on each side of fourth and fifth lumbar vertebrae. Turn on current slowly up to just as strong as patient can stand with a little discomfort. Give for 30 minutes daily, until results are seen, then continue on alternating days and gradually increase the time between treatments, until one treatment a week. (See illustration for Painful Dysmenorrhea.)

It may be well to give some internal and intravenous or hypodermic injections, Ferro-arsen to put on weight and its tonic effect. Sodium cacodylate, etc. Iron, Quinine and Strychnine, Syrup Hyperphosphite Comp., Maltine and Iron, etc. Also break up the courtship.

CHOLECYSTITIS (Remington)

SYNONYMS—Acute, chronic and suppurative inflammation of gall bladder.

ETIOLOGY—Gall stones. Chronic inflammation. Obstructions.

TREATMENT—Drainage. (See illustration for Gall-bladder drainage.) Place 2" x 3" pad at 5th and 6th right dorsal vertebrae, 4" x 6" pad at sacrum, patient on back. No. 8, Pulsating Galvanic Sinusoidal Current, 10 contractions per minute, to comfortable tolerance of patient. No. 4, Galvanic Wave Sustained Peak, positive pole pad 2" x 3" fifth and sixth dorsal vertebrae. Negative pad 2" x 3" over gall bladder. Start current slowly. Give up to 15 milliamperes, 10 contractions a minute for 15 minutes.

It will be advisable in the average case to precede the drainage with a mild diathermy or Biolite treatment for 15 minutes.

Internal medication such as gall bladder stimulants and cathartics, sodium phosphate, podophyllum resin, calomel and soda, Chionanthus and nux vomica.

CHORDEE

SYNONYMS—Painful erection.

ETIOLOGY—Direct Injury, Gonorrhea, Syphilis, etc.

TREATMENT—Passing of metal olive through Urethra, using Negative Galvanism is of great value. Follow this with Diathermy Treatment to Prostate, using Prostatic Electrode in rectum and block tin or Huth Metal about 6" x 8" on Abdomen; also Stimulative Massage No. 14, Rapid Sinusoidal Wave Current to Prostate, using Prostatic Electrode in rectum and 3" x 5" pad over 12th dorsal vertebra. 15 to 20 contractions per minute to comfortable tolerance—3 to 7 minutes. Internal antiseptic kidney dyes. Potassium Permanganate Irrigations. Pyridium tablets. Injection of 2% solutions of Niaz malophene.

CLAUDICATION, INTERMITTENT
(Remington)

SYNONYMS—Limping. Lameness. Painful muscular cramp, Angina cruris, dysbasia angiosclerotica intermittens.

ETIOLOGY—Sclerosis of post-tibial artery. Aneurysm of iliac artery. Syphilis. Alcohol. Tobacco.

TREATMENT—Large doses of Potassium Iodide over a long period. Massage. Hot baths and Galvanism. No. 4, Galvanic Wave Sustained Peak, 2" x 3" pads, Negative pole to lame spot; positive pole pad to foot or lower leg or sacrum. Give 15 pulsations per minute, 15 to 20 minutes, to comfortable tolerance of patient.

COCCYDYNIA (Remington)

SYNONYMS—Coccyx pain. Neuralgia, aggravated by sitting.

ETIOLOGY—Traumatism. Horseback riding. Childbirth. Fracture, Caries. Anal fissure. Tightly contracted sphincter ani muscle. Internal hemorrhoids. Proctitis.

TREATMENT—Best results will be obtained by using some soft material so as to get a good coaptation to the coccyx. Face rag folded to fit in the gluteal fold. Soap the area with *Kirks Green Soap* and then apply the folded face rag or cloth well soaked in hot water. Lay the 2" x 3" pad on or under, according to the position in which you have the patient lying. Attach this pad to the negative pole of No. 4, Galvanic Wave Sustained Peak. Place a 4" x 6" pad to the sacrum or sacral lumbar region for 15 to 20 minutes, at 15 contractions per minute, to patient's comfortable tolerance.

Follow above treatment with No. 10, Oscillatory Wave Sustained Peak, 15 very strong contractions to inhibit and sedate.

The usual treatment is to block the nerve with alcohol injections, or remove the bone.

COLITIS MUCOUS (Remington)

SYNONYMS—Tubular Diarrhea, Intestinal Catarrh, mucous colic.

ETIOLOGY—Chronic proctitis. Chronic appendicitis. Chronic constipation. Abuse of purgatives. Infectious diseases. Intestinal infections. Splanchnoptosis.

TREATMENT—Strict alkaline diet. Orange and lemon juices. Not even semi-solid foods until well after improvements have shown up, then no fibrous foods. Broths seasoned with butter and not with meats. Colonic irrigation with alkaline solutions. Acidophilous implantation. Castor oil in small doses for healing as well as cleansing and lubricating. No. 8, Pulsating Galvanic Sinusoidal, 2" x 3" pads well soaked and applied to the 7th and 8th dorsal vertebrae, very mild so as not to irritate an already irritated intestinal mucosa. Give current strong enough to just produce a ripple to the abdomen, and not a distinct pull-up, just so that you can see it, 10 pulsations per minute.

Diathermy through the abdomen. Place a 5" x 8" block

tin, or Huth Metal electrode under the back at sacro-iliac area, a mesh electrode 4" x 6" on abdomen and give up to 1,800 milliamperes for 20 to 30 minutes.

Ultra-violet energy air-cooled lamp in graded doses beginning with lamp at 40 inches above patient's abdomen, 1 minute treatment. Increase one minute a day and lower the lamp one inch a day, until patient is taking six minutes at fifteen inches. After good improvements have materialized start with Polysine, No. 10, Oscillatory Wave Sustained Peak for cell stimulation, to patient's comfortable tolerance, 10 to 12 contractions a minute for 15 minutes.

COLORLESS STOOLS (Remington)

SYNONYM—Colorless feces.

ETIOLOGY—Biliary obstruction. Milk diet. Excessive fat diet. Hepatitis. Deficiency of pancreatic juice. Jaundice cholecystitis.

TREATMENT—Stimulate pancreas and liver. One 2" x 3" pad at right fourth and fifth dorsal vertebrae and one at gall bladder region. Give No. 8, Pulsating Galvanic Sinusoidal up to patient's tolerance, 15 contractions a minute for 15 minutes. This treatment is to stimulate contractions of gall bladder and muscles of gall bladder area.

Or place one 2" x 3" pad to fifth and sixth dorsal vertebrae, right side; 4" x 6" under sacro-iliac region, No. 8, Pulsating Galvanic Sinusoidal, 10 mild contractions per minute, 15 minutes. This is to stimulate gall bladder drainage.

No. 4, Galvanic Wave Sustained Peak can be used in preference to No. 8, with positive pad 2" x 3" as above, negative pad 2" x 3" to gall bladder region.

To stimulate pancreas, place 2" x 3" pad on 10th left dorsal vertebra, also 2" x 3" pad on right fifth or sixth dorsal, 10 contractions per minute, to comfortable tolerance, for 15

minutes. It is well to proceed gently with this last treatment at first. If the patient has ever had any pleurisy and a few diaphragmatic adhesions are present, this treatment, if given with any amount of strength will cause very severe pains in the pleural cavity on the left side.

Internal medication should be something in the nature of bile stimulators, calomel, caroid and bile salts, touricol tablets, sodium phosphate, etc.

CONSTIPATION

SYNONYMS—Difficult defecation, retention of feces.

ETIOLOGY—Faulty eating, lack of habit, growth, obstructions, stricture of rectum, syphilis, hemorrhoids.

TREATMENT—Royal S. Copeland, M. D., former Health Commissioner, New York, made the statement: "If there is one ailment more than any other which is responsible for human distress, it is constipation. If there is one ailment more than any other which is neglected by the human family, it is constipation."

Neiswanger stated: "To cure a case of constipation is to restore to good health in a large percentage of cases. It is important to the patient and should be as great a credit to the physician as is a successful operation for appendicitis to the surgeon. To prescribe laxatives for habitual use is to temporarily relieve only, and to permanently increase the difficulty; but in electricity we have a therapeutic agent for the permanent relief of this ailment that cannot be overestimated."

No means of treating habitual constipation is so universally successful as the Sinusoidal current. For this purpose my apparatus has been arranged to give a rate of contraction similar to the peristaltic movement of the intestines 10 to 12 per minute. (See illustration for Splanchnoptosis.)

Eberhart uses No. 4 on Model 1158 Polysine. The author suggests No. 8, Pulsating Galvanic Sinusoidal, for its non-stinging action, and more pronounced stimulating effect, followed later with No. 10, Oscillatory Wave Sustained Peak, for its stronger pull. Use 2" x 3" pads on 7th and 8th dorsal vertebrae, 15 to 20 minutes, 11 contractions per minute, causing decided contraction, to patient's comfortable tolerance. Rectal divulsion regular and systematic. 5% phenol and olive oil injections for hemorrhoids.

CORNEAL ULCER

SYNONYMS—Ulcer of Cornea of eye.

ETIOLOGY—General poor health, infections, traumatisms, Gonorrhea, herpes, foreign bodies and injuries.

TREATMENT—Cumberbatch reports good results with zinc ionization. Use zinc wire covered with cotton, moistened with 1% zinc sulphate solution, held in epilation needle holder. The soft cotton applicator may be held on the cornea, without irritation. Negative is a 3" x 5" pad, well moistened, on patient's hand or arm. Use 1/2 to 2 M. A., for three to five minutes. Use indirect Tesla or Oudin over the eye by placing patient on auto-condensation pad connected to Tesla or Oudin terminal, operator placing one or more fingers over the closed eye for mild heat to stimulate circulation and absorption.

Wm. D. Rowland, M.D., F.A.C.S., Boston, Mass., in an article appearing in the June, 1931, issue of the American Journal of Physical Therapy, states that negative pole Galvanism is useful in stimulating healing of corneal ulcers and in absorbing scars following their healing. He states that it is doubtless of benefit in stimulating regeneration of nerve function in paralytic strabismus and some claims have been made for it in optic atrophy. It is decidedly helpful in reducing strictures in the lacrimal passageway and improves the possibility of clearing up some of these conditions not successfully handled by probing alone.

CYSTITIS

SYNONYM—Inflammation of Bladder.

ETIOLOGY—Exposure to cold, Constipation, Infections, Gonorrhea, Colon Bacillus, etc., Irritating Beverages, Pressure, Irritations such as misplaced Uterus, etc.

TREATMENT—No. 8, Pulsating Galvanic Sinusoidal, using one 2" x 3" pad over 12th dorsal and one 4" x 6" pad over sacrum. 15 mild contractions per minute for 5 to 10 minutes. Irrigation of Bladder with saturated solution of Boracic Acid. Never use indifferent pad over pubic bone as it causes undue and injurious pull on the bladder. Also internal medication of Urotropin with Acid Sodium Phosphate-5 gr. Tablets. Also, Liq. Glyco-Ammonium Acetate and sweet spirits of Nitre. Azo dyes. Pyridium, NIAZ malophene, etc.

DIABETES

SYNONYM—Glycosuria or over abundance of sugar in blood and urine.

ETIOLOGY—Passive Glycosuria, Dietetic indiscretion or any conditions causing improper function of the Pancreas.

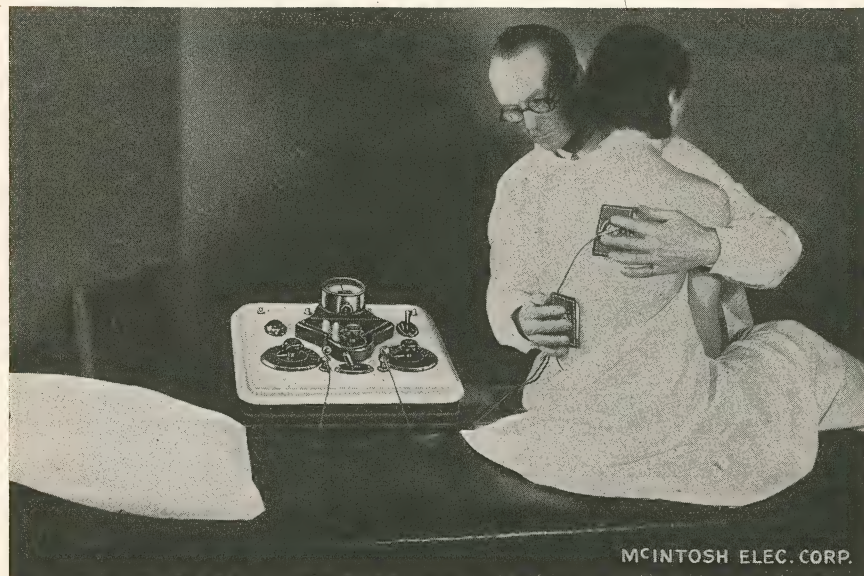
TREATMENT—Stimulate Pancreatic Secretion by using Diathermy through Pancreas. A 3" x 4" piece of Block Tin or Huth Metal over Pancreas and 6" x 8" piece of Block Tin or Huth Metal at back. Follow with No. 8, Pulsating Galvanic Sinusoidal Current, placing one 2" x 3" pad at 10th dorsal, one inch to the left of the spine and the other 3" x 5" pad at sacrum. 8 to 12 mild contractions per minute for 5 to 10 minutes.

DUODENAL ULCER

SYNONYMS—Peptic ulcer (certain types).

ETIOLOGY—Traumatism. Hyper-acidity. Pancreatic disease. Faulty diet, too much meat and high protein foods. Infectious diseases. Malnutrition. Lack of sunshine and exercise. Fatigue and exposure to damp and cold. Syphilis.

TREATMENT—Place one 2" x 3" pad at the 10th dorsal vertebra, left side; another pad over the fifth and sixth dorsal, right side.



In Duodenal Ulcer the Pulsating Sinusoidal Current is a valuable current for stimulating the secretory function of the pancreas and thereby increasing the alkalinity of the duodenum

Hold pads in place while the patient reclines, or until he lies on back. Use No. 8, Pulsating Galvanic Sinusoidal Current. Turn on current to patient's comfortable toleration for about 15 minutes. 6 to 8 contractions per minute. Repeat 3 times per week. This treatment stimulates the secretory function of the pancreas and thereby increases the alkalinity in the duo-

denum, bringing it to normal reaction with relief from the characteristic pain.

In bad cases apply diathermy to pancreas for 15 minutes and follow with Pulsating Galvanic Sinusoidal treatment as above. Diathermy heats and stimulates the pancreas and produces an arterial hyperemia of the gland. Above technique increases the pancreatic secretion and will often control pernicious vomiting in pregnancy. (Ireland.)

Be sure not to place electrodes for diathermy over pyloric area, for fear of causing any bleeding, great or little. Use above in conjunction with internal alkaline medication.

All uncooked, highly seasoned or spiced foods; tea, coffee, and alcoholic drinks; all nuts and fruits containing seeds such as raspberries, blackberries, etc., are absolutely prohibited. Milk diet for one year. Take for 6 months the following:

R Bismuth Subnitrate $\bar{\text{z}}\text{iv}$.
Milk Magnesia $\bar{\text{z}}\text{vi}$.
Aromatic Cascara $\bar{\text{z}}\text{ii}$.
Chloroform $\bar{\text{z}}\text{i}$.
Syrup Rhubarb Comp. q.s. $\bar{\text{z}}\text{xvi}$.
Sig: Shake well.
Instructions: Take $\bar{\text{z}}\text{ii}$ A. C. followed with
a little water.

(Dr. Arnott, London, Ont.)

DYSMENORRHEA (Neiswanger)

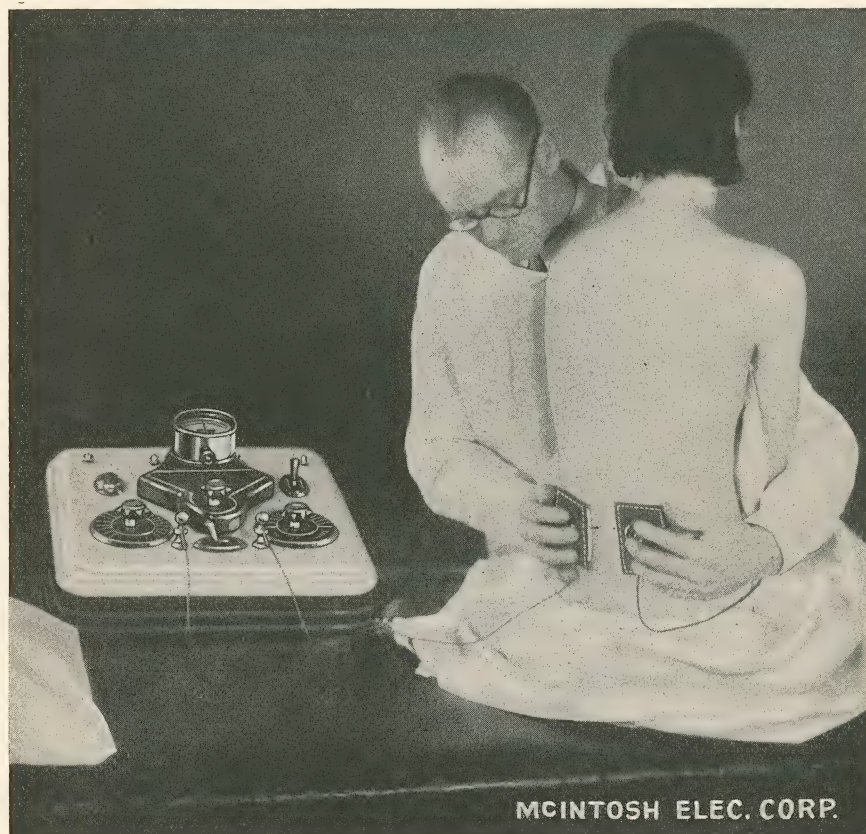
SYNONYMS—Painful menstruation.

ETIOLOGY—Infantile uterus, sclerosis of cervix at external os, congestion, hypo-gonadism, inflammation, prolapsed uterus, mechanical obstruction.

TREATMENT—The advantage of early treatment is apparent to every thinking physician, for he realizes that in time, the

uterus, from lack of support, drops back into the hollow of the sacrum, the hard feces rasp over the fundus, inflammation ensues with consequent adhesions, and the patient becomes an invalid.

For treatment of these cases we require both Galvanic and Wave Currents, also infra-red or diathermy to soften adhesions, if any. A small metal olive, about No. 10 French, mounted upon an insulated staff is attached to the negative pole of the Galvanic Current, the positive being a large pad, well moistened and placed upon the abdomen. A vaginal



Painful Dysmenorrhea. A twenty minute treatment with the Pulsating Galvanic Sinusoidal current will usually cause the pain to disappear.

speculum is now introduced and when the external os is well exposed, the olive-shaped electrode is inserted into it. The electrode will not enter the canal, but the current is gradually turned on by the aid of the rheostat, until from 5 to 7 milliamperes are reached. Just enough pressure should be used to keep the olive electrode firmly in contact with the mucous membrane. Hydrogen froth will be seen coming out around the edge of the olive; the alkaline action of the negative pole causes the tissue to become soft and slippery, the instrument goes slowly forward until it passes through the internal os and is in the fundus.

We have now enlarged the uterine canal a little and although the action of the negative pole is stimulating, it is not sufficiently so to increase muscular cell growth, so we leave the electrode in place, *turn off* the rheostat or current controller and switch from the Galvanic current to No. 6, Super-Imposed wave or No. 8, Pulsating Galvanic Sinusoidal. Give a mild current at about 5 to 20 contractions for the purpose of massage for 5 to 10 minutes.

These currents not only tend to increase the muscular fiber of the uterus and its attachments, but stimulate the absorbents to take up the products of decomposition set free by the first part of the application.

At the second treatment, which should be in about three days, we employ the same olive-shaped sound or electrode; introduce it without the aid of galvanism and use only the No. 8, Pulsating Galvanic Sinusoidal massage. At the third sitting the sound is increased in size by one number, and introduced by the aid of the negative pole of the galvanic current as in the first seance, and followed by No. 8, Pulsating Galvanic Sinusoidal massage.

As it is much easier to increase the lumen of the canal than the muscular fiber of the organ, we should only continue to increase the size of the sound up to a certain point, when we can omit the galvanism and use only Pulsating Galvanic

Sinusoidal massage. These treatments should be given with due antiseptic precautions.

In many cases the author has developed a uterus $1\frac{1}{2}$ inches to $2\frac{1}{2}$ inches in depth after eighteen or twenty treatments, employing the technique described herein.

In Dysmenorrhea of the neuralgic type, Ireland suggests the technique illustrated on Page 49.

DYSMENORRHEA (Painful)

SYNONYMS—Painful menstruation.

ETIOLOGY—Hardness of cervix, hypo-gonadism, ovarian dysfunction.

TREATMENT—Use No. 8, Pulsating Galvanic Sinusoidal. Place one 2" x 3" pad electrode on each side of the third lumbar vertebra (autonomic center of the uterus). Turn on current to patient's comfortable tolerance at 15 contractions per minute for at least 20 minutes, when the pain should have disappeared. (Ireland.) Also one 2" x 3" pad to 12th dorsal vertebra, a 4" x 6" pad to sacrum; No. 8, Pulsating Galvanic Sinusoidal for uterine contraction, 15 contractions for 15 to 20 minutes, to patient's comfortable tolerance.

DYSPEPSIA (Nervous)

SYNONYM—Hysteria of stomach. Nervous Indigestion.

ETIOLOGY—Hysteria. Insanity. Overwork. Mental stress. Worry. Poisons. Brain tumors. Syphilis.

TREATMENT—Slow eating. Lay on right side $1\frac{1}{2}$ hours after eating. Polysine Modality No. 8, Pulsating Galvanic Sinusoidal, 2" x 3" pads at 7th and 8th dorsal vertebrae, 11 contractions per minute for 10 minutes. Current strong enough to see a ripple on abdomen.

DYSTROPHY (Progressive Muscular)

SYNONYM—Loose shoulders. Waddling, duck-like gait.

ETIOLOGY—Hereditary. Defective or faulty nutrition.

TREATMENT—Massage. Mild galvanism of leg, arm and shoulder muscles. No. 4, Galvanic Wave Sustained Peak, 2" x 3" pads to neck or brachial plexus, forearms, hands, legs and feet. For arms, 2" x 3" pad at brachial plexus, one in hand. For legs, 2" x 3" pad at feet or calf of leg, 4" x 6" pad at sacrum, negative at place or muscle that needs active stimulation and positive at indifferent place such as sacrum. 15 contractions per minute, 10 to 15 minutes, being careful to avoid over-exertion.

ENDOMETRITIS

(See Cervicitis)

ENTROPION

SYNONYMS—Wild Eyelashes.

ETIOLOGY—Trachoma, burns and injury to lids, inflammatory condition of eyeball, atrophy of eyeball.

TREATMENT—Misplaced eyelashes may be removed by negative Galvanism, by following practically the same technique as given for Epilation on page 70, remembering that one must use a milder current about the eye than may be used on other portions of the face.

ENURESIS

SYNONYMS—Incontinence of Urine. Bed Wetting.

ETIOLOGY—Pituitary insufficiency, Excessive alkalinity in Urine, Intestinal Worms, Drinking fluids in excess, Slight Paralysis of neck of Bladder.

TREATMENT—Place 2" x 3" well soaked pad on each side of 1st, 2nd and 3rd lumbar vertebrae, letting patient lay on pads, using No. 8, Pulsating Galvanic Sinusoidal Current to patient's comfortable tolerance, 12 to 15 mild contractions per minute for five to fifteen minutes.

Internal medication Anterior Pituitary gland substance.

EPILATION (Neiswanger)

SYNONYMS—Removal of superfluous hair.

ETIOLOGY—Shaving. Exposure to sun. Hypo-gonadism.

TREATMENT—(Neiswanger) The physician, as a rule, does not do enough cosmetic work, but is too apt to relegate it to some facial artist, who is totally unfitted.

How many times do we hear the complaint, "I have had the hair removed from my face several times, but it always comes back worse than ever." There need be no such complaint, if the operator understands the proper manipulation of the current and instruments, because there is no surer way of destroying a hair follicle than by electrolysis.

In this operation, as in most others, success mainly depends upon the instruments employed. We cannot do good work without good tools. If we have properly shaped needles, good forceps, a suitable magnifying glass, good light and understand the application of the current, the work becomes a pleasure, and success is assured.



The Hayes bulbous-pointed needle

The "Hayes Bulbous-pointed needle," a magnified drawing of which is shown, was devised by the late Dr. P. S. Hayes and is best adapted for this work for several reasons. (See book—"Facial Blemishes"—Hayes.)

A scar left in destroying a hair by electrolysis, or in fact, any blemish, is the result of producing decomposition of the epidermis, and if this is avoided, scar tissue will never result.

It is a well known fact that the most electrical energy is expended at the point of best contact, because that point is the one of least resistance. It can readily be seen that in using the bulbous-pointed needle, the point of best contact is in the bottom of the hair follicle—just where we want it, but if we

should use a sharp-pointed needle, the point of best contact is in the epidermis, where the most decomposition would take place, and a scar would be the result. It would also be evident that with such a needle the hair follicle would not be destroyed, because nearly all the electrical energy has been expended at the surface.

A powerful reading glass with a focal distance of about five inches can be used to magnify the site of operation, allowing plenty of working space between the glass and the tissues.

The forceps should be of steel—light and strong—the inner aspect smooth and in good, even contact. The indifferent electrode is about the size of the palm of the hand.

A short needle holder is best adapted for the purpose, especially when removing hairs under the chin, and the distal end should be sufficiently pointed so as not to obstruct the view of the operator.

The patient should be placed flat on the back on the operating table, with the head level with the body, and the indifferent electrode, after being well soaked, is placed on the pectoral muscle in front or on the upper border of the trapezius behind. The patient should never be allowed to hold this electrode in the hand or otherwise have control of it, because they soon learn that by making light pressure the sensation is more comfortable, and incidentally, the operator does poor work.

The needle holder, being fastened to a light conducting cord, is attached to the negative pole of the galvanic current. The needle is now carefully introduced into a hair follicle, following the direction of the hair shaft, and the current turned on by means of the rheostat until $\frac{1}{2}$ to 2 milliamperes are reached. $\frac{3}{4}$ milliampere is often sufficient. Hydrogen froth will commence to come out around the needle; in some texts this is given as evidence that the follicle is destroyed, but such is not the case. The length of time the needle must remain in the follicle depends upon the character of the hair and

GLEANINGS OF LOW VOLTAGE TECHNIQUE

the strength of current employed, and can only be learned by experience. The hair is destroyed when it comes out without traction.

After the current strength has been once established it should not be turned off, but the needle introduced into successive hair follicles with the current turned on. It is no more disagreeable to the patient to operate in this way than to introduce the needle and then turn on the current, and besides, saves much time and inconvenience. It also allows more rapid work because you can operate on four or five hairs before picking up the forceps to remove them.

Wherever a hair is removed a little vesicle appears, and if too many hairs are operated upon in close proximity these little vesicles will become confluent and make a sore. It is always best to press out these little blisters, using for this purpose a piece of absorbent cotton, then wash the part with boric acid solution.

Less current may be used on the upper lip than on other parts of the face; first, because the hairs do not grow so deep, and second because in that location the pain is greater. A good operator may remove one hundred hairs in an hour and not have over 5% return.

EPISTAXIS

SYNONYMS—Nose Bleeding. Nasal hemorrhage.

ETIOLOGY—Trauma, Internal Hemorrhage, Hypertension, etc. Hemophilia.

TREATMENT—Positive Ionization with a strip of zinc covered with cotton soaked in $\frac{1}{2}$ of 1% solution of Zinc Sulphate passed up the nose as far as possible with negative 2" x 3" pad on back of neck, will constrict and invariably stop bleeding, using about 4 or 5 milliamperes for 10 minutes. Thromboplastin applied with pressure.

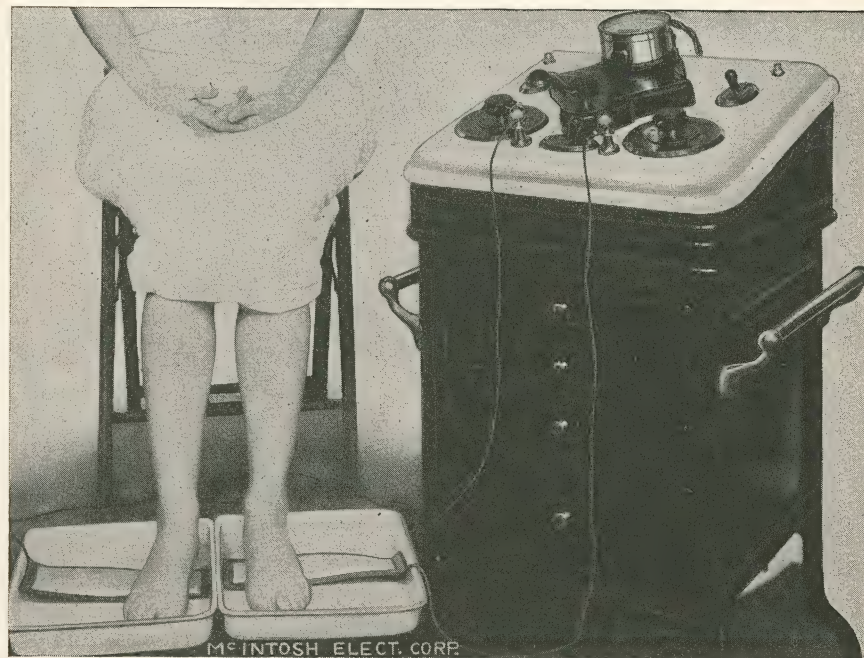
FALLEN ARCHES

SYNONYMS—Flat foot, splay foot, talipes valgus.

GLEANINGS OF LOW VOLTAGE TECHNIQUE

ETIOLOGY—Rotating of tibia and fibula at knee-joint. Weakness of ligaments between bones composing the two foot arches.

TREATMENT—Use No. 6, Super-Imposed Wave. Fill two enameled trays with enough water to cover the top of the toes and immerse a fair sized pad electrode in each tray. Place a foot on each pad. Connect the pads to the apparatus and turn on current gradually until decided contractions are produced.



Fallen Arches call for treatment with the Super Imposed Wave, which markedly strengthens the feet and relieves their tired feeling

Continue for 10 to 15 minutes and repeat daily. This treatment markedly strengthens the feet and relieves their tired feeling. 20 contractions per minute. (Cross.) Or, use No. 8, Pulsating Galvanic Sinusoidal, followed with No. 10, Oscillatory Wave Sustained Peak, 15 minutes, 10 to 20 contractions per minute.

FEET (Painful)

An article contributed by Wm. Martin, M. D., of Atlantic

City, N. J., to the American Journal of Physical Therapy, issue June, 1931, outlines a symptomatology which he describes as "Painful Feet," which may be the result of some local condition, such as fallen arches or flat foot, or may be simply a state of relaxation of the arches.

Dr. Martin considers the sciatic nerve as the basic factor in these cases and suggests treatment with the *static wave current, applying a 4" x 5" metal electrode over the sciatic notch of the side involved and in case of both nerves being affected, treating each notch in turn, starting with a small spark gap current to test the nerve tenderness, and gradually increasing to tolerance, for 20 minutes. He next applies the electrode to the site of the articulation, for the same length of time. This point on each side will usually be found to be the most tender, and less current will be borne. It is also the sciatic branch usually ignored in the treatment and it may prove to be the key point. Dr. Martin makes a regular practice of treating this area on both sides in all cases where both are involved. For muscular development and what might be called general toning up of the structures, he employs the Galvanic Sinusoidal current, applying one pad over the sciatic notch and the other to the foot, allowing 10 minutes for each leg, with a rather moderate current dosage, to avoid tiring the weak muscles. Treatments are given three times weekly. In some instances the back pad is sufficiently large so that it will cover the lower spine as well as the notch.

Building up the arches with the usual felt pads or arch supports should be done with judgment. Foot exercises should be prescribed and massage given, if indicated. Various walking exercises, such as the ladder, walking pigeon-toed, raising the feet from the floor on the toes, and other forms, will suggest themselves.

*Note:—Those who are not equipped with a static machine and are not in a position to apply the static wave current will secure an excellent inhibitory effect by the application of Modality No. 12, Waveless Oscillatory Current, of McIntosh Polysine Generator, placing one electrode over the sciatic notch on the side involved and the other electrode at the periphery of the nerve affected.

FISTULA

SYNONYMS—Pus-draining canal. Sinuous ulcer.

ETIOLOGY—Gonorrhea. Injury. Traumatism. Infected rectal crypts. Proctitis. Constipation.

TREATMENT—Neiswanger stated, that metallic cataphoresis (cupric ionization) accomplishes everything that could be desired. He employed a pointed copper wire probe and attached it to the positive terminal and introduced it as far as possible into the fistula. Treat every three or four days. The negative terminal should be a well-soaked 4" x 6" pad. Rotate the rod to prevent sticking, or if necessary, the current may be reversed to free the electrodes, or lance. Treat daily as by Barr of Cleveland.

FLAT FOOT

SYNONYMS—Weak foot. Splay foot. (Displacement of astragalus on tarsus.)

ETIOLOGY—Congenital. Improper attitude. Turning feet out in walking. Improper shoes. Cramping feet. High heels. Weak muscles. Poor health. Old age. Tile floors. Too much standing. Paralysis. Sprains. Fractures. Gonorrhea. Arthritis.

TREATMENT—See section on "Fallen Arches" (Page 72), and photograph illustrating technique. Use No. 8, Pulsating Galvanic Sinusoidal. Place each foot on a folded terry cloth face rag, same placed on a 2" x 3" pad, well soaked in hot salt solution. Turn on current slowly to patient's tolerance from 8 to 12 contractions a minute, for 15 minutes. Follow with No. 10, Oscillatory Wave Sustained Peak. Turn on as much current as the patient can comfortably tolerate at 8 to 12 contractions per minute, for cell and nerve stimulation, 3 to 5 minutes.

FOOT DROP

SYNONYM—Dangle foot.

GLEANINGS OF LOW VOLTAGE TECHNIQUE

ETIOLOGY—Metallic poisoning, syphilis, injury, traumatism, a symptom of multiple neuritis. Paralysis of leg muscles.

TREATMENT—In treating injuries of the external popliteal nerve, (Foot Drop), the Interrupted Rapid Sinusoidal produces a deep, but mild stimulation and will get results when other currents fail. Or, use Interrupted Oscillatory Wave, No. 11. Place a 4" x 6" pad (neutral) over the sacral plexus and a spongio disc electrode over the motor points of the external popliteal. The main motor points of the external popliteal are:

1. Tibialis Anticus
2. Extensor Communis Digitorum
3. Peroneus Longus



Treating "Foot Drop" with the Polysine. Thousands of cases were treated in the United States Army with uniformly good results

Treat 10 to 15 minutes. Adjust the current to patient's comfortable toleration, 6 to 8 interruptions per minute. Ireland states that thousands of cases were treated in the United States Army with excellent results. (Ireland.)

FUNCTIONAL IMPOTENCY (Remington)

SYNONYMS—(Male) Lost manhood. Lost power. (Female) Frigidity. Coldness.

ETIOLOGY—(Male) Hereditary. Mumps. Orchitis from traumatism. Tuberculosis. Syphilis. Carcinoma. Undeveloped testes. Malnutrition. Sex Excess. Gonorrhea. Fatigue. (Female) Hereditary, following childbirth, some lasting 4 years.

GLEANINGS OF LOW VOLTAGE TECHNIQUE

Ovarian insufficiency. Fatigue and exposure to cold and damp. Abortions. Sexual excess. Masturbation. Malnutrition. Drugs. Gonorrhea. Syphilis.

TREATMENT—(Male) Proper rest and diet. Plenty of good air and sunshine. Exercise.

Biolite 15 minutes to the scrotum and abdomen. Air cooled quartz lamp exposures beginning with 1 minute at 40 inches, increasing one minute and decreasing the distance one inch at each treatment until taking 6 minutes at 15 inches. Compression treatment with the water-cooled quartz lamp, three areas on each testicle, 10 to 15 seconds, causing a good irritating dermatitis. Operator holding or grasping the testicle through scrotum with left hand, and with the water-cooled lamp in his right hand, he makes firm pressure against the grasped testicle, until patient says "Hot," which requires about 10 to 15 seconds.

Polysine No. 4, Galvanic Wave Sustained Peak, 2" x 3" pad at 12th dorsal vertebra, connected to positive pole. 2" x 3" pad under abdomen, suprapubically, connected to negative pole. Increase current very slowly so as not to shock or irritate the patient unduly, increase current up to patient's tolerance, 15 to 18 pulsations for 20 minutes. Decrease current to zero and switch to No. 8, Pulsating Galvanic Sinusoidal. Slowly increase current up to patient's tolerance, 15 to 18 pulsations per minute for 20 to 30 minutes. Follow with injections of orchic substance at each treatment. (Female) Biolite or diathermy through abdomen, 15 minutes. If diathermy is used place a 6" x 8" block tin or Huth Metal electrode under sacrum and a kidney-shaped block tin or Huth Metal electrode suprapubically, 2½" x 4". Give 900 or more milliamperes. Follow with water-cooled ultra-violet energy through a vaginal or a prostatic tube. Begin with two minutes on each side and increase one minute at each seance until the patient is taking six minutes on each side. Following the first treatment the patient will notice a discharge and in some cases she will speak of it, complaining to you that you are making her worse, caus-

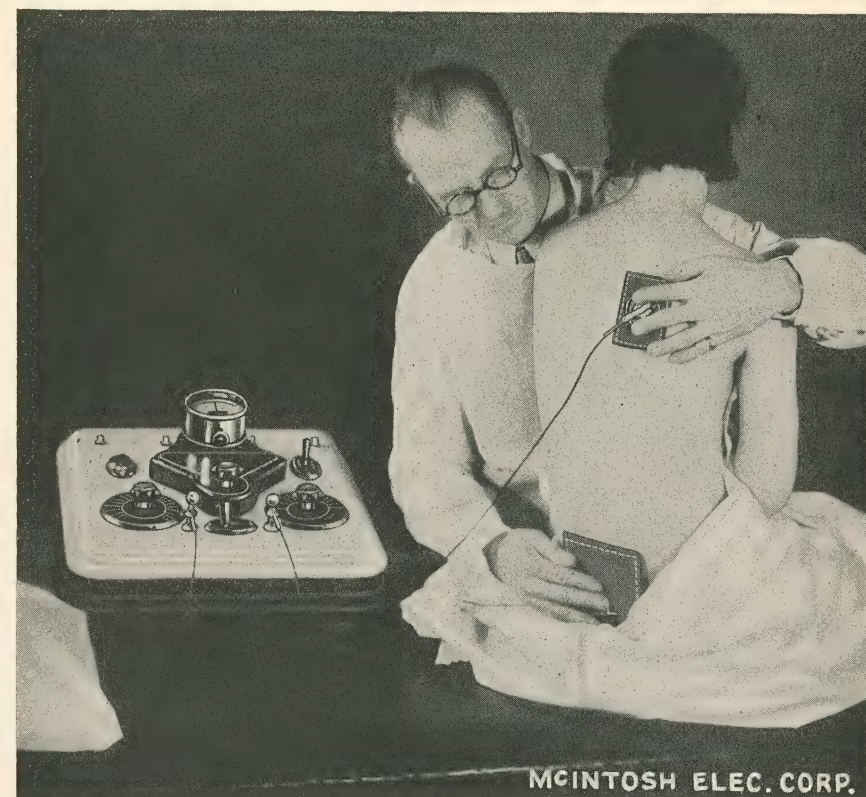
ing her to have leucorrhea. You can quiet her fear of this by stating that the discharge will disappear, following the third treatment, which is the rule in the average case. Another thing the patient will complain of is a great relaxation of the vagina, as though it is getting larger. This is because of the increased secretion from within, due to the stimulating effect of the ultra-violet energy on the vaginal and cervical glands. You can advise the patient that this extra relaxation will gradually disappear as everything returns to normal.

Following the mercury quartz lamp (ultra-violet energy) treatment, it is advisable to stimulate the ovarian centers through the reflex centers, which are the second to fourth and fifth lumbar vertebrae. Use No. 8, Pulsating Galvanic Sinusoidal, 2" x 3" pads, one on each side of spine, 15 contractions per minute, causing mild contraction for 15 to 20 minutes. Injections of ovarian substance or corpus luteum.

GALL BLADDER (Drainage of) (Ireland)

SYNONYM—Lavage of gall bladder.

TREATMENT—Because of the irritating effect of some currents on the delicate skin of some patients, we now use No. 8, Pulsating Galvanic Sinusoidal, which gives the same pull as No. 6, Super Imposed Wave on Polysine No. 1158. Place 2" x 3" pad at fifth and sixth dorsal vertebrae, right side. Place 4" x 6" pad under sacrum. Give a mild treatment at first so as not to cause too much stimulation to the reflex center, and later, about two hours, have a spell of vomiting or regurgitation of bile. 12 pulsations per minute; with mild currents. To overcome any spastic contraction of the duct, the above treatment may be followed with a treatment of No. 4, Galvanic Wave Sustained Peak with the negative pad 2" x 3" over gall bladder region and a 3" x 5" pad over fifth and sixth dorsal vertebrae, right side, 6 to 10 contractions a minute for 15 minutes, 30 to 45 milliamperes. After several treatments No. 10, Oscillatory Wave Sustained Peak may be given to hurry up improvement



Drainage of Gall Bladder. Here the slow, rythmical contractions of the Pulsating Galvanic Sinusoidal provide an effective and simple method of treatment

by nerve stimulation. Give 8 to 10 deep, mild contractions for 15 to 20 minutes or longer if necessary.

GLAUCOMA

SYNONYM—Intra-Ocular Tension.

ETIOLOGY—Unknown. Occurs between 50 and 70, women more often than men.

TREATMENT—Wm. D. Rowland, M. D., F. A. C. S., Boston, Mass., in an article appearing in the June, 1931, issue of the American Journal of Physical Therapy, states that the positive pole of the Galvanic current may be employed for its dehydrating and devascularizing effect, at times when intra-ocular tension arises to a glaucomatous state in iritis or irido-

cyclitis and where atropine must be used. Acute inflammatory glaucoma may also be brought under control at times with this current.

Another use made of positive Galvanism is in the control of misplaced lid margins, by multiple punctures which causes contractions by scar formations. Both entropion and ectropion are often well treated with this method.

GOITER (Simple) (Eberhart)

SYNONYMS—Big neck. Enlarged or Hypertrophied thyroid. Struma. Bronchocele.

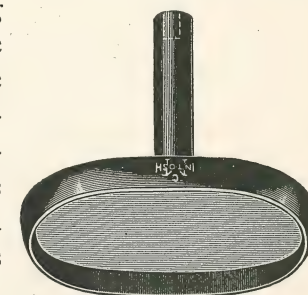
ETIOLOGY—Localities with a lack of iodine and calcium. Hereditary.

TREATMENT—Negative Galvanism and iodine are indicated in the treatment of enlarged thyroid gland. A 3" x 5" pad applied



Simple Goiter treated with Galvanism and iodine

to the back of the neck is used as the indifferent electrode and connected to the positive pole. The active electrode, connected to the negative pole, may be a special goiter electrode as shown in cut, or a pad of varying size according to the area to be treated. Use No. 1, Galvanic. The Active electrode is thoroughly moistened with a 2% solution of potassium iodide, or any soluble iodine may be used. The current is turned on gradually, 5 to 20 milliamperes and applied for 30 minutes or longer. Repeat three times a week. Many satisfactory results have been reported with this method. As iodine is heavy, it requires a long treatment to thoroughly introduce it. Failure often results if treatment is too short.



No. 6146. Neiswanger
Goiter Electrode

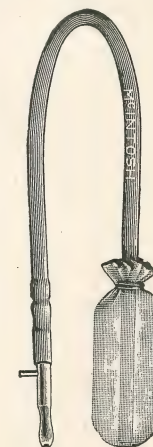
GONORRHEA IN THE FEMALE

SYNONYMS—Clap. Gonorrheal infection.

ETIOLOGY—Promiscuous intercourse. Contact with Gonococcus germs either directly or indirectly, as intercourse with an infected male, or from indirect infection by contact with clothing, towels, borrowed unclean underclothing, or toilet seat contaminated by primary infection.

TREATMENT—Two methods are satisfactory in treating this condition. They are diathermy and positive Galvanism. They may be used separately or in conjunction with one another. The Neiswanger bag with a copper or zinc solution used for 30 minutes will be found an effective treatment. The technique is the same as given under Leucorrhea.

Use a small gauze wick or drain placed in the urinary meatus, same having been soaked in



No. 6131. Neis-
wanger Bag
Electrode

GLEANINGS OF LOW VOLTAGE TECHNIQUE

a solution of Zn SO_4 , $\frac{1}{2}$ of 1%. Allow the wick or drain to be long enough to reach from urinary meatus into vaginal canal so as to come in contact with the vaginal applicator or solution.

With diathermy place a 6" x 8" electrode under the sacrum, and at the suprapubic region a kidney shaped electrode $2\frac{1}{2}$ " x 4". Be sure and soap the skin well. After placing the electrodes and connecting to the machine, place a piece of rubber sheeting over same and hold down with a good sized sand-bag. Give 900 M. A., or more for one hour or more, the longer the seance the quicker the results. All of these cases should receive the introduction of a good sized sound (14 to 30 F., Keys double taper sounds) so as to get a dilatation coming and going. Follow each sounding with an irrigation of a weak solution of potassium permanganate, with one small crystal of zinc sulphate. Grind the crystals of both KMnO_4 and ZnSO_4 in a mortar. The results obtained are worth it. The solution thus obtained is more beneficial. Three or four soundings are usually the rule for good results, at intervals of three to four days.

GRANULATED EYELIDS (Eberhart)

SYNONYMS—Granulomatus lids.

ETIOLOGY—Foreign bodies. Dust. Infections. Irritating soaps. Traumatism. Poor health. Fatigue. Exposure to damp and cold while fatigued. Working under too strong a light, etc.

TREATMENT—Use stiff brush to remove granulation, with saline solution. Use Positive Galvanic, Modality No. 1. Connect a small copper spatula electrode (see page 9) to the positive pole. The 3" x 5" pad (indifferent electrode) is placed on back of the neck, or any convenient point, and connected to the negative pole. Evert the eyelid and gently move the spatula over the granulated area until it turns a grayish green color. Use a current strength of one M. A., or less and repeat treatment in five days. Three to four treatments will often clear up this condition.

GLEANINGS OF LOW VOLTAGE TECHNIQUE



Granulated Eyelids.

Three or four treatments with Positive Galvanism often clear up this condition

Ultra-violet energy with a nasal applicator gently passed over the lid mucous membrane, conjunctiva, just enough to give a mild reaction.

HORDEOLUM

SYNONYM—Sty.

ETIOLOGY—Errors of Refraction, Eye Strain, Hyperacidity. Infection.

TREATMENT—Positive Ionization with weak solution of Zinc Sulphate to relieve pain and inflammation. Use cotton soaked with Zinc Sulphate under 2" x 3" pad over eye; Negative 3" x 5" pad back of neck. Give 1 to 3 milliamperes for 5 to 10 minutes. Yellow Oxide of Mercury applied to the eye.

HAY FEVER (Remington)

SYNONYMS—Pollenosis. Hay asthma. Autumnal catarrh.

ETIOLOGY—Hypersensitive Schneiderian mucous membrane. Pollen. Dust. Proteids, etc.

GLEANINGS OF LOW VOLTAGE TECHNIQUE

TREATMENT—Positive galvanism to mucous membrane of each nostril, separately or together. Use a bifurcated connection for the nostrils if giving treatment to both sides at once. Roll cotton on end of wire or connection and soak same in a solution of zinc sulphate, $\frac{1}{2}$ of 1%. Pack one or both nostrils with cotton soaked in the same solution, then pass the wire with cotton on it up against the nasal packing. Fasten this firmly in place by adhesive tape, running from edge of nose to forehead. If the tape is arranged correctly on the wire, it will hold the application properly within the nostril. Turn on current to four milliamperes and not over 5 M. A., for 15 minutes. The nasal applicator is attached to the positive pole. A 3" x 5" pad is attached to the negative pole and placed to back of neck. This treatment will not only shrink the congested nasal mucosa, but it will also open up the sinuses. Follow the Galvanic treatment with Mercury Quartz Lamp, air or water-cooled, nasal applicator No. 3827 (Mehlers'). This applicator is flattened out a little beginning back two inches from the proximal end to the distal end, and it is also bent to a slight angle from the proximal end so as to fit into the nasal canal, either up or down. Place the applicator within the canal, the angle up. Give two minutes. Turn applicator with the angle down and repeat two minutes. Move to other nostril and repeat. Let case rest one day and repeat, but increase the treatment one minute at each position, that is, as follows: First treatment 2 min. up, 2 min. down each side. Second treatment 3 min. up, 3 min. down. Third treatment 4 min. up, 4 min. down, until patient is taking 8 min. up and 8 min. down, or seven treatments. The galvanic should be given every fourth day. Four treatments.

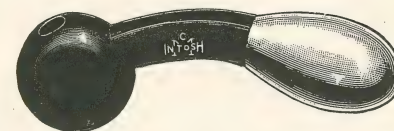
HEMORRHOIDS

SYNONYMS—Piles. Vascular tumor of rectum.

ETIOLOGY—Chronic constipation. Constant straining at stool. Too many enemas. Persistent catharsis with chemically irritating drugs. Proctitis. Tight sphincter ani. Faulty diet.

GLEANINGS OF LOW VOLTAGE TECHNIQUE

TREATMENT—(Neiswanger) Place patient upon the table in Sims' position. Wet thoroughly a pad as large as the hand, or larger. Attach it to the negative pole of the Galvanic current and place upon the abdomen. The positive pole is connected to the cop-



No. 6053. Neiswanger Copper Rectal Electrode for Hemorrhoids

per rectal electrode, which is then carefully introduced with the curved side down, pushing up with the electrode any fringe or prolapsed membrane. The current is now turned on by means of a rheostat, until 5 milliamperes is reached, and al-



No. 6137. Eberhart Copper Rectal Electrode for Hemorrhoids

lowed to flow for 10 minutes. In most cases the treatment may be repeated every second day. The process here given is not intended to apply to old, hard, external hemorrhoids.

Another method employs Negative Galvanism, using a needle connected to the negative pole. The positive pad, 3" x 5" or larger, on hip or abdomen. The needle is inserted into the hemorrhoid and the current turned on giving 5 M. A., or more if necessary, until the tissue appears red around the needle, making one or more punctures to cover the whole mass. The treatment is practically painless.

Another method is ligation with linen or silk, putting on a new ligature each day, until mass drops off, which is as a rule ten days.

Blanchard's method: Injecting the surrounding tissue is another method. The solution is phenol 5% in olive oil. Never cut an internal hemorrhoid. Keep all scar tissue out of the rectum. The external hemorrhoids should be cut. Clean out necrotic blood. Trim with scissors, but do not suture. Apply hot pack to stop any hemorrhage and dress with ST 37, S & D.

HICCOUGH (Persistent)

SYNONYMS—Singultus. Spasm of glottis and diaphragm.

ETIOLOGY—Irritation of phrenic nerve. Inflammation of abdominal viscera. Chronic nephritis. Diabetes. Ingestion of hot liquids or highly seasoned foods and liquids.

TREATMENT—(Eberhart) The condition can be instantly relieved by applying two small spongio disc electrodes at the fourth cervical vertebra, one on either side, and applying the current at a moderate strength. This produces a stimulation of the phrenic nerve and contracts the diaphragm. Use the Pulsating Galvanic Sinusoidal, Modality No. 8, comfortable tolerance, 10 to 12 pulsations per minute.

HYPERSENSITIVE URETHRA

SYNONYMS—Burning urethra. Hot urine. Urethritis.

ETIOLOGY—Chronic Gonorrhea. Urethritis. Seminal-vesiculitis. Prostatorrhea. Chronic Prostatic Inflammation. Cystitis. Gout. In female, antero-flexed uterus. Hyper-alkaline Cystitis.

TREATMENT—(Neiswanger) This unfortunate condition, which is one of the sequelae of prostatic disease and gonorrheal infection, is more far-reaching in its deleterious effects upon sexuality than is generally imagined. It is one of the great causes of psychological impotence. The electrode for the treatment of these cases is of special design, as shown in appended cut. Ab-

sorbent cotton is loosely wound on the applicator, and its entire length well wetted with a normal salt solution. After being replaced in the hard rubber sound, it is attached to the



Urethral Electrode No. 6103 Supplied with Copper, Silver and Zinc Wire Applicators

positive pole of a galvanic current and introduced to the full depth of the urethra. The negative is a pad on the abdomen. A current strength of 10 milliamperes is maintained for 10 minutes and the seance repeated not oftener than once in four days.

IMPOTENCY

(See below, "Infantile Uterus.")

IMPOTENCY—Male and Female

(See under "Functional Impotency.")

INFANTILE UTERUS

SYNONYMS—Baby uterus. Small uterus. Undeveloped uterus.

ETIOLOGY—Tumors of reproductive organs. Mal-development during childhood. Congenital Syphilis. Tuberculosis. Traumatism. Overwork. Debility. Wasting diseases. Anemia. Obesity. Chronic alcoholism. Morphinism. Diabetes. Infectious diseases. Smallpox. Mumps. Masturbation. Ovarian Insufficiency.

TREATMENT—(Eberhart) The treatment for infantile uterus is the same as that for sub-involution, because the exercise of these undeveloped muscle fibres will cause them to increase, the same as the exercise of muscular tissue elsewhere. The sinusoidal method is precisely the same as in sub-involution, but in

using galvanism, we employ the negative electrode in the tiny cervix, with the positive over the fourth lumbar, because of the dilating effect of the negative pole. Exercise. Uterine exercise. Sunlight. Abdominal exercise. Clean air. Good, clean living. Diet. Proper rest. Intestinal cleanliness.

Uterine exercise: 2" x 3" pad well soaked, over 12th dorsal vertebra. Patient on abdomen. 4" x 6" pad well soaked over sacrum, both pads well weighted with sand bags. No. 8, Pulsating Galvanic Sinusoidal, 15 minutes, 15 contractions per minute, patient's comfortable tolerance. This modality gives excellent cellular stimulation. Follow this current with the No. 4, Galvanic Wave Sustained Peak. This current produces chemical and mechanical action and therefore the negative pole must be connected to the active electrode. Give 10 to 12 contractions for 15 to 20 minutes, with current to patient's tolerance. (*Note: Never change from one modality to another except when the current controller is at its lowest point.*).

INTESTINAL STASIS

(See under "Constipation.")

SYNONYMS—Constipation. Intestinal atony. Splanchnoptosis. Autointoxication. Lazy bowels.

ETIOLOGY—Overeating. Meat gormandizing. Proctitis. Intestinal infection. Typhoid. Amebiasis. Dysentery. Tropical Diarrhea. Cholera. Hypertension. Alcoholism. Dope fiends.

TREATMENT—Place a large pad electrode, 4" x 6", over the region between the inferior angles of the scapula (7th and 8th dorsal); the other pad, 2" x 3", is applied over the region of the sigmoid, splenic and hepatic flexures, or cecum as the individual case indicates. Have pads well saturated. Gradually turn on the current, selecting Modality No. 8, Pulsating Gal-

vanic Sinusoidal, with about 8 to 10 contractions per minute. Increase the current until pronounced contractions are noted, and treat for five to ten minutes daily. Do not make the contractions too powerful or the treatments too prolonged at first. Most cases show noticeable improvement after a few treatments, when the Oscillatory Wave Sustained Peak (No. 10) may be substituted and the treatments cut down to three a week until patient is discharged. With a large pad electrode placed over the lumbar spine and a covered metal electrode in the rectum, a good exercise treatment of the latter may be given with the No. 8, Pulsating Galvanic Sinusoidal. Biolite to dorsal region, 15 minutes, No. 6, Super-Imposed Wave or No. 8, Pulsating Galvanic Sinusoidal, 2" x 3" pads to 7th and 8th dorsal vertebrae, one on either side. Give 10 to 12 contractions per minute for 15 minutes, patient's comfortable tolerance, occasionally 60 volts. Abdominal muscular exercise: Have patient assume the knee chest position or bed to floor position, knees on bed, hands on floor. Draw in abdominal muscles, hold for 10 seconds and then push out and hold for 10 seconds. Repeat 10 times at least twice a day, morning and night. Also any other exercises that will aid the abdominal muscles.

KELOID

SYNONYMS—Growing scars. Scar tumors.

ETIOLOGY—Unknown, except for traumatism.

TREATMENT—Waddington recommends Ionization with the positive pole of the Galvanic current, Modality No. 1, connected to a zinc needle to penetrate the growth. The negative pole is connected to a saturated pad which may be placed on any convenient part of the body. Treat for 15 to 30 minutes with a current strength of 25 to 50 milliamperes, dependent upon the size of the growth and the time which the current is al-

lowed to flow—a weaker current demanding a longer time. Radium and x-ray.

LEUCORRHEA (Remington-Eberhart)

SYNONYMS—Whites. Female weakness. Inflammation. Cervical catarrh. Vaginal discharge.

ETIOLOGY—Malposition of uterus. Gonorrheal Cervicitis. Non-specific Cervicitis. *Cervical lacerations*. Subinvolution. Constipation. Infection. Vaginitis. Excess coitus. Masturbation.

TREATMENT—Perforated copper ball covered with 3 layers of good sterile cotton, and then a layer of fish skin. Make several small perforations in fish skin to allow solution to pass



No. 6095. Neiswanger Vaginal Cataphoric Electrode

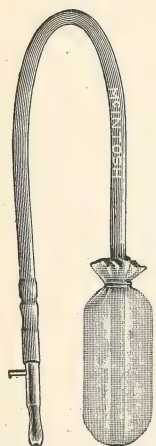
through. Insert a bivalve vaginal speculum within the vagina. Swab out all secretions with clean hot water on a cotton swab with the uterine dressing forceps. After you have made a clean sweep of the vaginal mucosa, place the perforated copper ball electrode well up against the cervix and slowly and carefully remove the speculum leaving the electrode in good position. Place a 4" x 6" negative pad suprapubically. Have the pad well soaked with Sodium Chloride solution, fill a Valentine irrigator with $\frac{1}{2}$ of 1% Zn SO₄ solution, or $\frac{1}{2}$ of 1% Cu SO₄ solution, or a little of each, say half and half. Attach the irrigating tube from irrigator to the copper ball electrode which is in position within the vagina. Snap on to the tubing, close to the distal end of applicator, a shut-off snap or hemostat, and regulate the flow of solution from irrigating jar just fast enough so that the solution will last 15 minutes. Connect vaginal copper ball electrode to the positive pole of Polysine.

Turn on current slowly and gradually; run it up to 20 milliamperes for 20 minutes. This treatment can be repeated in 4 days. It is a good plan to supplement this treatment with one of the same current, using instead of the copper ball electrode, the intra-uterine copper electrode with an insulated tip connected to the positive pole. (The reason for insulated tip is that current will intensify at the extreme tip and if your patient be one with a large boggy uterine fundus, which is soft, the least amount of pressure will be liable to cause the electrode to burn a hole through the fundus and produce a very bad result.) See that intra-uterine electrode is large enough to fit snugly within the cervical canal, so as to touch all surfaces. Give from 10 to 15 milliamperes of current, or as patient's tolerance permits, for 15 minutes.

There is one thing to guard against in these cases. Be sure there is no old pyosalpingitis. An old pus tube will not stand this treatment, there would be a flare up of acute symptoms which may necessitate an operation. If there are any questions in your mind as to the presence of an old pus tube, and you think the patient needs the positive galvanic treatment, do not give over six milliamperes of current for 15 minutes. It is better not to treat such cases.

After a few minutes you will find that the uterine electrode cannot be rotated, and is held firm within the canal. This is due to the contracting action of the positive pole. Turn the current off. Reverse the polarity and give 5 milliamperes for 30 to 60 seconds then remove with a little force. It will bring away a little discharge and tissue, producing about the same results as a curettage, and as a rule, equally as good. Repeat the treatment every four days until there is a fairly negative discharge, then give a few negative galvanic treatments with the same intra-uterine electrode for alkaline reaction, so as to neutralize the acid action of the positive pole and to liquefy the remaining debris, if any.

(Eberhart) The galvanic treatment is best given with the Neiswanger bag electrode. This bag holds about 100 c. c. of



No. 6131. Neiswanger Bag Electrode

fluid. You may use either copper or zinc sulphate in the solution, and do not have it stronger than one or two percent. In using the copper sulphate solution put in just enough of the copper sulphate to give the hot water a distinct greenish blue color.

The electrode is introduced in the collapsed form and then filled with the solution, which either may be put in through a good sized syringe, or by attaching the irrigator tube to the end of the electrode. A towel around the electrode and anchored by the sand bag, which holds the negative pad on the abdomen, will keep the end of the electrode from dropping down and spilling the solution. In putting the bag on the electrode, there should be left about one inch between the rubber tubing and the end of the bag, otherwise there will be too much pressure at this point. Also, when distended with the solution, a small part of the bag should extend outside the vulva, so that Bartholin's gland and duct, which are favored sites of infection, may also receive the benefit of the treatment. 20 milliamperes for 20 minutes is the average dose. In case of severe conditions such as those of definite specific origin, the time should be greatly increased, even as long sometimes as an hour.

This electrode is ideal for these vaginal conditions, because it fits more closely to the vaginal wall than any metal electrode and because the distention stretches out the little rugae or folds in the vagina.

LUMBAGO

SYNONYM—Backache. Myalgias, acute or chronic.

ETIOLOGY—Exposure to cold or draft during fatigue. Strain or overuse of muscles. Alcoholism. Influenza, La Grippe, Gout, Sagging bed. Bathing in extremely cold water.

TREATMENT—No. 8, Pulsating Galvanic Sinusoidal, 2" x 3" pads placed above and below on one side or set of lumbar muscles. Give patient's tolerance, 15 minutes, then cut current off and switch to other side and repeat. Treatment daily or every other day, about three treatments usually needed, causing 20 decided contractions per minute for 3 to 5 minutes.

(Waddington) If acute, use positive galvanism; if chronic use negative galvanism with the active pad electrode placed over the lumbar region and a larger pad under the abdomen and the patient in a prone position. Give 20 to 40 milliamperes for 20 to 30 minutes and follow this with 10 minutes of the No. 14, Rapid Sinusoidal Wave at 20 contractions per minute to patient's tolerance. Repeat daily or thrice weekly.

MAMMARY GLAND ATELIA

SYNONYMS—Flat chest. Infantile breast.

ETIOLOGY—Injury. Ovarian and thyroid insufficiency. Tight clothing.

TREATMENT—Ireland suggests the technique for stimulation of secretion of Mammary Glands as illustrated and described below.

STIMULATION OF SECRETION OF MAMMARY GLANDS

TREATMENT—(Ireland) Use Modality No. 8, Pulsating Galvanic Sinusoidal. Two 2" x 3" pads are placed over the third dorsal nerve, one on each side. Treatment is given with the patient sitting up or lying down on back, 10 minutes daily, 8 to 10 contractions per minute with current turned on to patient's comfortable tolerance. This will increase the milk supply



Stimulating the secretory function of the Mammary Glands with resultant increase of the milk supply

through stimulation of the secretory function of the mammary glands. Repeat treatment every day until normal secretions are obtained. Frequency six to eight waves per minute.

MENORRHAGIA

SYNONYMS—Heavy menstruation. Long menses at regular period. Profuse menstruation.

TREATMENT—Same as for "Metorrhagia."

METORRHAGIA

SYNONYMS—Long, heavy menses between periods, or at any other time.

ETIOLOGY—Chronic pelvic congestions. Fibroids. Polypi. Cancer. Uterine displacement. Ovarian diseases. Inflammatory diseases. Change of region from low to high altitude and vice versa. Sex hygiene. Widowhood two years or more with no sexual contact during this period by women previously very active sexually.

TREATMENT—Positive galvanism with intra-uterine copper electrode as for cervicitis and endometritis, 5 to 15 milliamperes for 15 to 30 minutes, followed with the perforated copper ball electrode as used in Leucorrhea. Internal medication Cyanothin 1 teaspoonful every hour as long as necessary, or any other good styptic. Orchic substance per hypo three times a week for one month. Rest during menses. Two times a week for two months.

(Neiswanger) This condition requires the application of the positive pole of Galvanism. The treatment is simple. Take the ordinary copper ball vaginal electrode (see cut),



No. 6116. Copper Ball Vaginal Electrode

cover it with a pad of absorbent cotton, well wetted, and place it well up in the posterior vault of the vagina, attached to the positive pole, the negative being the usual abdominal pad. Employ a current strength of from 15 to 20 milliamperes for 10 minutes, and repeat the treatment three times per week for the three weeks preceding the menstrual flow. Physicians who have not tried this means of treating a very common trouble will be surprised at the next menstrual period being almost, if not quite, normal.

MYALGIA

SYNONYM—Muscular pain.

ETIOLOGY—Fatigue. Exposure to cold and damp. Lack of sunshine and good clean living. Poor food. Lack of exercise. Infection, intestinal or otherwise. Any focal infection. Traumatism.

TREATMENT—(Waddington) Use the same technique as described under Lumbago, applying the electrodes to conform with the affected area.

NEVUS PIGMENTOSUS (Removal of)

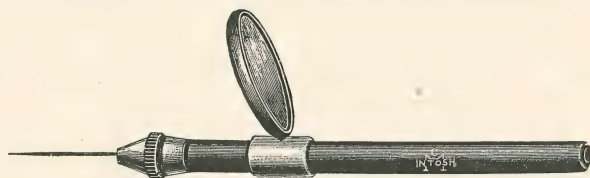
(Neiswanger)

SYNONYM—Pigmented moles.

ETIOLOGY—Congenital.

TREATMENT—After ruling out the possibility of malignancy, it may be safe to remove moles or warts on the patient's face or body with practically the same technique as for epilation.

Into a needle holder the same as is used for epilation, is inserted an ordinary half-curved surgeon's needle, small size being preferred, or even a medium-sized sewing needle. The



No. 6207. Needle Holder with magnifying glass

indifferent or positive electrode is a pad which, after being well wetted and placed on that pole, is applied to the body at some convenient place. The needle, which should always be attached to the negative pole, is inserted into the growth at the base on a line with the skin, not quite through, but nearly so. The current is now gradually turned on until a very small

amount is reached, probably $\frac{1}{2}$ milliampere, when, in a little while, the current can be gradually increased up to 5 M. A., if desired, without causing any great pain. The fact must be borne in mind that the longer the current is flowing, the less will be the pain. This is no doubt caused by the tissue becoming dead on account of the active decomposition taking place along the course of the needle. A sign of decomposition in the removal of these growths is the color we get. The growth will commence to blanch slightly as soon as the current begins to flow, and just as soon as the entire growth has assumed a decidedly blanched appearance, we know that electrolysis of the contents has taken place, and that in a few days it will become black and finally come off as a crust. If the entire growth is not blanched by introducing the needle one way, it will be necessary to introduce it again at the same sitting, in a cross direction. Always destroy a growth at one sitting, unless it is quite large.

The scar left after removal of warts and moles will be insignificant and be gradually absorbed, but when removing them about the face for purely cosmetic purposes, it is best to insulate the needle with shellac varnish to within a small space at the distal end. In this way we avoid electrolysis of the epidermis at the point of entrance of the needle, which always makes a small scar.

The same technique here given for warts and moles answers for all benign growths. Also one may use Indirect Tesla and Oudin sparks.

NEURASTHENIA

SYNONYMS—Nervous prostration.

ETIOLOGY—Prolonged and excessive expenditure of energy.

TREATMENT—Splanchnic Neurasthenia is a very common condition presented often for treatment—a condition of exhaustion of the greater, lesser and smaller splanchnic nerves. These nerves

are visceros and vaso-constrictors, functioning from the lower half of the lungs, including the liver, gall-bladder, spleen and pancreas, which is a non-contractible organ, but capable of stimulation through another nerve center, of which more will be said later. The main function of these nerves is to hold the organs in perfect tone, normal size, and also to control the diameter of the veins, holding their caliber to normal against the pull of gravity, which force, otherwise, would cause a dilatation and stagnation of the blood supply. When we have completed a day's work and say we are tired, we really mean that our splanchnic nerves are becoming tired, allowing the veins to be more or less dilated from the pull of gravity which is overcoming the effort of the splanchnics to hold them to their normal diameter. When an individual becomes tired there is a dilatation of the abdominal veins, which produces in many cases twice as much weight as normally should be there. With this added weight and exhaustion of the splanchnics, we have a general picture of *splanchnoptosis*. This is the beginning of the dropping of the viscera, of which *ptosis of the stomach* is the most prevalent symptom, transverse colon is next, this in some cases dropping enough to form the shape of the letter U. These phenomena we find to be more of a condition in the beginning than a disease. The extra amount of blood in the abdomen must come from somewhere and usually comes from the highest point of gravity, which is the brain, producing the resultant cerebral anemia, with the common symptoms of forgetfulness, blues, melancholia (even into suicidal tendencies) with the added low pressure, also low pulse pressure. This condition was common with the soldiers during the late World War and was known by the misnomer of "shell-shock." We treated thousands of these cases following the war. This gives a short description of splanchnic neurasthenia, and the treatment requires stimulation.

Knowing that all stimuli are reflexed from central to peripheral (for example the ulnar nerve at the elbow, when struck, is immediately felt in the finger tips), we place the elec-

trodes as near the root of the nerve as possible, which for the splanchnics would be one electrode placed on either side of the spine about one inch from spine and directly below the angle of the scapula with patient lying on his back on these electrodes using the Super-Imposed Wave or No. 8, Pulsating Galvanic Sinusoidal for stimulation. Turn on the current gradually, not quite to the point that will be uncomfortable to the patient. When the wave comes on and reaches its highest point, the patient will feel the pulling produced by contraction in the abdomen. In the majority of cases the abdomen may be seen moving in an inward and upward direction, responding to the impulse through these nerves.

In the army hospitals it has been demonstrated with the aid of an X-Ray that a dropped stomach may make an excursion of as much as ten inches upward under each pull of the current.

One may readily see, therefore, what can be accomplished with an abdomen of this type in treating general ptosis, atonic constipation, post-operative adhesions, etc., and the effect upon low blood pressure.

In arriving at diagnosis of these cases it should be borne in mind that the blood pressure of the patient will be higher with the patient reclining than when in an upright position.

Remember that in all of the above technique the length of time for treatment for stimulation is from 10 to 15 minutes and that over-stimulation produces just the opposite effect or in other words—exhaustion. Repeat treatments about 3 times per week.

This technique has produced successful results in the author's practice and other physicians have reported favorable and gratifying reactions to the treatment.

NEURITIS

SYNONYMS—Neuralgia. Nerve pain. Rheumatism. Nerve inflammation.

GLEANINGS OF LOW VOLTAGE TECHNIQUE

ETIOLOGY—Focal infections. Intestinal infection. Toxic poisoning. Fatigue. Exposure to damp and cold. Poor living. Excessive meat diet. Syphilis. Infectious diseases.

TREATMENT—(Waddington) Ionization of sodium salicylate (neg. pole) or quinine bichloride (positive pole). Gradually increase the current to a maximum of 20 M.A., for $\frac{1}{2}$ hour. Repeat in two or three days as required. Follow this treatment with 3 to 5 minutes of the Oscillatory Wave No. 9, using a barely perceptible current, 10 to 15 contractions per minute, until the affected tissues are less sensitive to manipulation.

OBESITY

SYNONYMS—German Goitre. Over Abdominal Weight. Corpulence. Fatness. Pendulous Abdomen.

ETIOLOGY—Gormandizing. Overeating. Too much fats and sweets. Hypo-thyroidism.

TREATMENT—Use a stimulative wave current such as the No. 10, Oscillatory Wave Sustained Peak; also colonic irrigations, 2 or 3 times per week. Place one 3" x 5" pad well soaked, at eleventh and twelfth dorsal and the other pad over second and third lumbar, each pad covering whole area where used, causing 15 strong contractions per minute for 15 to 20 minutes.

OTALGIA

SYNONYM—Ear Ache.

ETIOLOGY—Trauma, Congestion of Eustachian Tube, Lodging of foreign bodies in ear, any ear irritation. Furuncle.

TREATMENT—Positive Ionization using Messiaur Ear Electrode

GLEANINGS OF LOW VOLTAGE TECHNIQUE

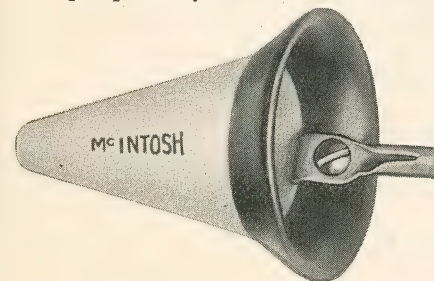
with a cotton wick inside of the electrode making contact with the zinc and protruding about $\frac{1}{2}$ inch through the small opening into the ear. Fill ear and saturate the wick with 1% solution of Zinc Sulphate in ear. Use 3" x 5" pad on side of face opposite ear treated. Give 1 to 3 milliamperes for 5 to 10 minutes twice a week. Have patient lie with head on side. Great benefit is derived by following with infra-red (Biolite) lamp treatment and Ultra-violet energy with quartz nasal applicator. Medication—usual procedure as irrigating the ear with mild antiseptic solution and inserting Glycerin and Phenol.

OTITIS MEDIA

SYNONYM—Inflammation of the middle ear.

ETIOLOGY—Foreign bodies in the ear. Tonsillitis. Streptococcic infection of the tonsil or eustachian canal. Erysipelas, Scarlet Fever, etc.

TREATMENT—(Eberhart) Use Modality No. 1, Galvanic. In suppurative Otitis Media excellent results have been obtained with zinc ionization. The patient lies on the table on his side with the affected ear up. An insulated speculum designed for this purpose by Dr. F. E. Messiaur, is introduced into the ear and

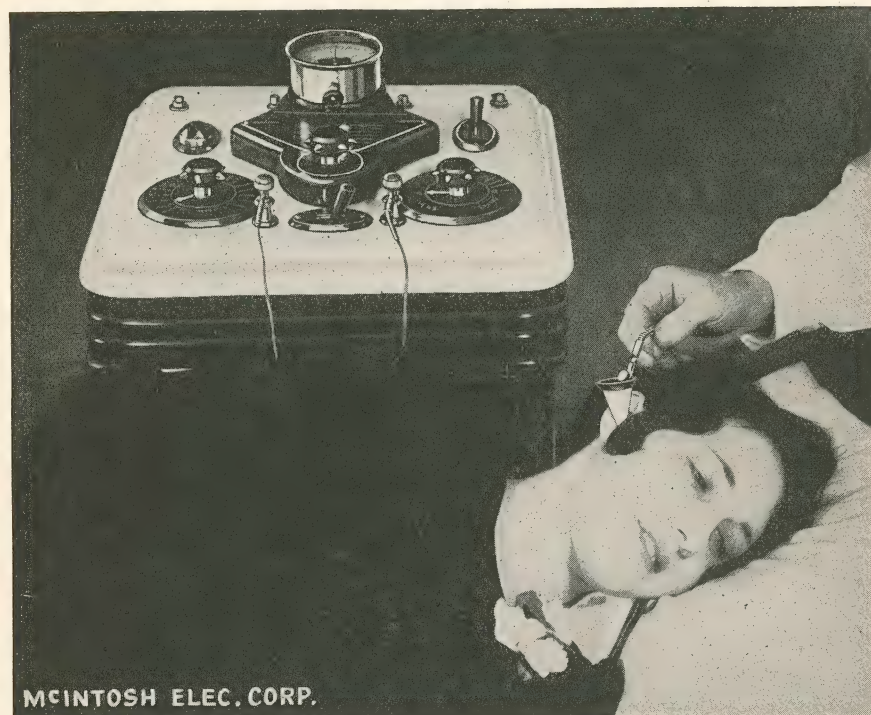


No. 6262. Messiaur Aural Ionizing Chamber

filled with a dropper, with a 1% zinc sulphate solution. This is connected to the positive pole. A 3" x 5" pad is placed under the shoulder and connected to the negative pole. Treat 10 to 30 minutes, with treatments five days a part. The average current strength is from two to five milliamperes, according to patient's toler-

GLEANINGS OF LOW VOLTAGE TECHNIQUE

ance. Infra-red (Biolite) generator. Ultra-violet—2 minutes with pencil applicator.



Suppurative Otitis Media. Zinc ionization has proven a very effective method. Some remarkable results have been reported where only a few treatments were required

POLIOMYELITIS (Anterior)

SYNONYM—Infantile Paralysis.

ETIOLOGY—Infection by way of nasal passages. A filtrable globoid organism (Flexner and Noguchi), or a pleomorphic streptococcus (Rosenow). Biting stable fly. Common house fly. Bed bugs. Possibly related to distemper of dogs and horses.

TREATMENT—(Ireland) Treat soon after acute stage has passed. Use diathermy or infra-red to extremities to soften muscle

GLEANINGS OF LOW VOLTAGE TECHNIQUE

tissue where atrophy has set in and to stimulate circulation. Select Galvanic Wave current, No. 3, for first five or six treatments. Apply a 2" x 3" pad to patient over cervical spine from positive pole; a 3" x 5" pad is attached to negative pole and placed on patient's forearm. Use 15 contractions per minute for 5 to 10 minutes, with 5 to 10 milliamperes. Then continue treatments with Pulsating Galvanic Sinusoidal, No. 8. Place the 3" x 5" pad over brachial plexus and a 2" x 3" pad on forearm, over extensor motor points of affected arm, also at bicep and tricep motor points, causing a mild contraction at each point selected, using approximately 20 contractions per minute.

For lower extremities, place the 3" x 5" pad at sacrum and use the 2" x 3" pad over various motor points of the leg, especially over tibialis anticus and peroneus longus, selecting No. 3, Galvanic Wave current negative pole for first five or six treatments, as above, using 20 contractions per minute with current strong enough to turn the foot and ankle. Use only a short time during first treatments and increase to 10 minutes for each leg, as case progresses. Follow with No. 8, Pulsating Galvanic Sinusoidal for greater stimulation.

Another method is to bandage one 3" x 5" pad under arch of each foot, as in treating flat feet, with Pulsating Galvanic Sinusoidal, No. 8, causing mild to decided contractions above ankle for 5 to 10 minutes, using treatment for arms as above. Use mild and short treatments at first, so as not to exhaust nerve and muscle, which would retard recovery. Also have pads well moistened.

PROCTITIS

SYNONYM—Inflammation of the rectum.

ETIOLOGY—Chronic constipation. Ulcerations. Enteroptosis. Sedentary habits. Pelvic inflammation. Gonorrhea. Syphilis. Tuberculosis and Carcinoma.

TREATMENT—(Eberhart) For the various inflammatory conditions of the rectum, the best treatment is the use of positive galvanism with the Neiswanger bag electrode, or any other electrode which will permit the driving in of copper or zinc from the positive pole. Patient lies on his side, in the Sims' position. The negative electrode is placed under the patient's thigh. 15 to 20 M.A. of current is the average dose, given for 20 minutes.

PROSTATIC DISEASES

SYNONYMS—Senile fibrotic hypertrophy. Senile general hypertrophy. Gonorrhea. Syphilis. (See following technique.)

Prostatic Hypertrophy

SYNONYMS—Enlarged prostate. Old Man's Complaint.

ETIOLOGY—Gonorrhea. Syphilis. Traumatism. Chronic constipation. Alcoholism. Masturbation. Old age. Pelvic inflammations. Cystitis. Sexual excess.

TREATMENT—(Ireland) The prostate can be contracted by applying a 2" x 3" pad to the 12th dorsal nerve and a large pad 4" x 6" at the sacrum. Use the No. 8, Pulsating Galvanic Sinusoidal, 6 to 8 pulsations per minute. Treat for 15 minutes and repeat 3 times per week. This application makes a very agreeable form of massage and is very effective for reducing the size of the gland. It is especially indicated in a large spongy or vascular gland.



No. 6136. Eberhart's Prostatic Electrode

Senile: Diathermy. Patient on his back. Eberhart electrode in the rectum, kidney shaped block tin applicator

2½" x 4" suprapubically. Have the skin well soaped. Place a glass urinal between the patient's legs so as to catch the dribbling urine. Give 600 milliamperes of current for 15 minutes. Change patient to the static chair and give 15 minutes of static wave with a three-inch air gap on the draw rods. Repeat every other day for 20 treatments. Follow this with ionizing doses of x-ray to destroy any fibrous tissue that may be left. If there is any urinary tenesmus the best relief is with the Polysine No. 8, Pulsating Galvanic Sinusoidal, six to eight pulsations per minute. Voltage to patient's tolerance for 15 minutes, with Eberhart electrode in the rectum and 2" x 3" pad on the 12th dorsal vertebra. The 4" x 6" pad placed on the sacrum can be substituted for the Eberhart electrode within the rectum.

PRURITIS ANI

SYNONYM—Itching anus.

ETIOLOGY—Proctitis. Internal hemorrhoids. Chronic constipation. Gonorrhea of the rectum. Freakish masturbation.

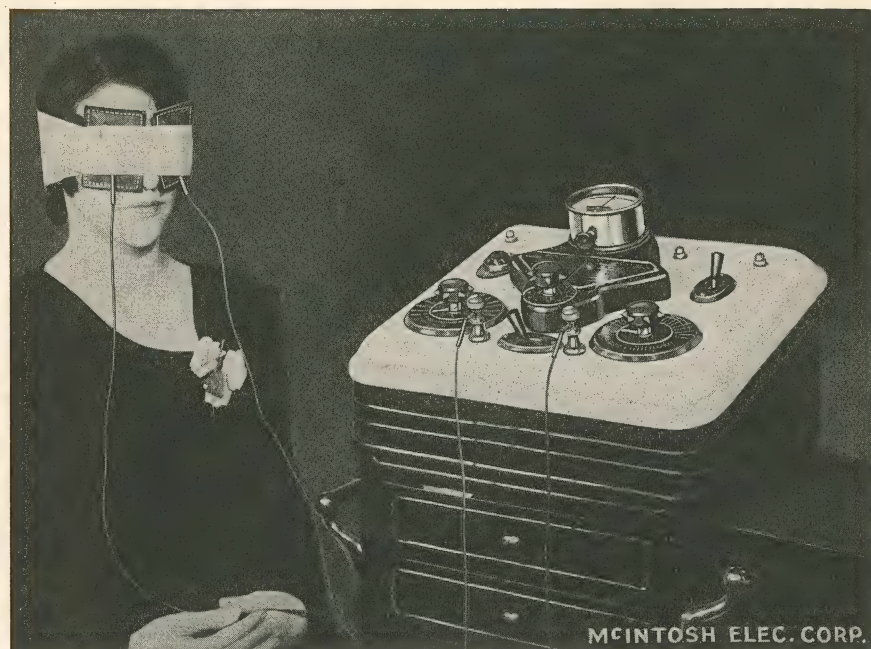
TREATMENT—(Eberhart) This is best treated by positive copper galvanism, using the method given under "Proctitis." Also diathermy of the rectum as for prostatic hypertrophy, also 5% solution of phenol in olive oil injections, as for internal hemorrhoids.

PTOSIS OF EYELID

SYNONYM—Drooping lids.

ETIOLOGY—Congenital. Third nerve paralysis. Syphilis. Injury. Hysteria. Poisoning. Exophthalmic goiter. Atrophy of muscles.

TREATMENT—(Ireland) Ptosis generally responds well to stimulation with No. 8, Pulsating Galvanic Sinusoidal. Use two small



Ptosis of the Eyelid generally responds well to stimulation with the Interrupted Slow Galvanic Sinusoidal

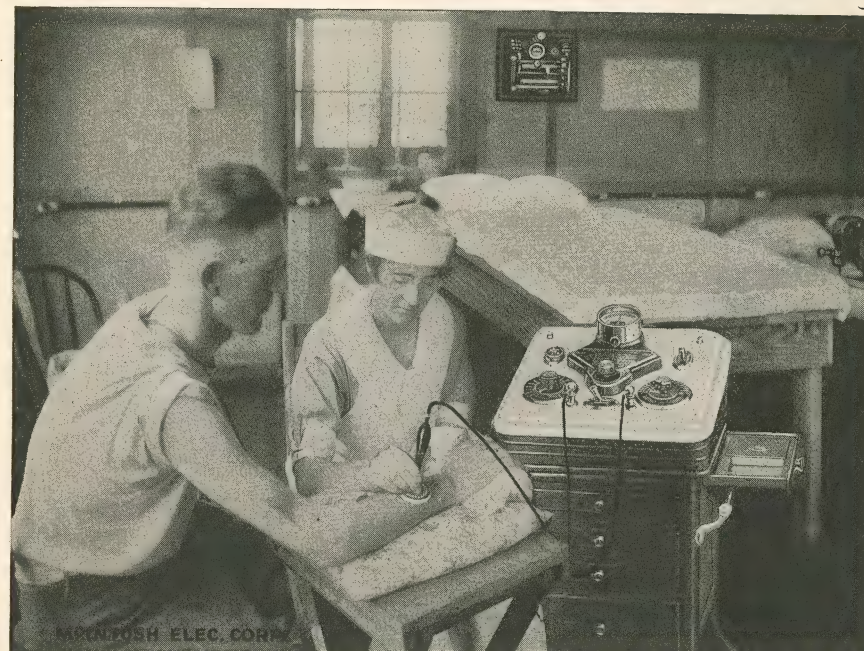
pads, one over each eye, turn on a small amount of current with about 10 contractions per minute. Treat for 10 to 15 minutes daily.

TESTING REACTION OF DEGENERATION

SYNONYM—Regional paralysis.

ETIOLOGY—War wounds. Accidental injuries.

TREATMENT—Use Interrupted Galvanic, No. 2. In diagnosis and prognosis of peripheral nerve injuries tests should be made to obtain the reaction of degeneration (R. D.) of nerves and muscles. A 3" x 5" pad is placed over the brachial plexus. The negative active electrode is a small metal disc covered with chamois, well moistened and applied to the motor point. For testing the nerves and muscles of the lower extremities, the neutral or inactive (pad) electrode is applied over the sacral



Testing Reaction of Degeneration (R. D.). Electrical testing of nerves and muscles forms an important part in diagnosis of peripheral nerve injuries, muscular atrophy, and paralysis

plexus. Frequency of interruptions 5 to 8 per minute. Tests are repeated every 30 days and a record of milliamperemeter readings is made to determine the progress of recovery toward normal.

RHINITIS

SYNONYMS—Inflammation of the nasal cavities. Ozena or stink nose. Catarrh. Coryza.

ETIOLOGY—Exposure. Infections. Syphilis. Traumatism. Foreign bodies. Malnutrition. Debility. Atony of nasal mucous membrane. Foreign proteids. Dust. Smoke. Gases and chemical vapors.

TREATMENT—(Eberhart) In simple chronic and hypertrophic Rhinitis, Positive Galvanism, No. 1 is indicated, as it decreases the blood supply and shrinks or hardens tissue.



Simple, chronic or hypertrophic Rhinitis is treated successfully with positive Galvanism, as it shrinks the tissue and decreases the blood supply

Connect two pieces of tinsel ribbon to the positive pole. About three inches of the distal ends are wrapped with absorbent cotton soaked in a 1 to 5000 adrenalin chloride solution, or Zn SO_4 Solution, $\frac{1}{2}$ of 1%, and introduced well back into both nasal cavities after they have been cleaned with a douche. The negative pole is connected to a 3" x 5" pad placed in back of the neck or on the arm. Use a current strength of 3 to 5 milliamperes and treat for five minutes or more. Continue treatment daily until swelling is relieved.

SCIATICA

SYNONYM—Rheumatism in the back of leg.

ETIOLOGY—Rectal ulcers. Ilio-sacral injuries and misplacement, also fracture, arthritis of same joint, Syphilis, Gonorrhea, and other focal infections.

TREATMENT—Use same technique as given under "Neuritis." (Waddington.)

SINUSITIS, Frontal

SYNONYM—Frontal Sinus Infection. Headache, frontal.

ETIOLOGY—Infection. Fatigue. Exposure to cold and dampness. Poor ventilation. Poor food. Smoke. Chemical vapors. Dust. Foreign proteids. Pollens. Syphilis.

TREATMENT—(Waggoner) These cases usually suffer untold agony. There is one diagnostic sign, and that is—pressure with the finger on the floor of the sinus just over the eyeball produces considerable pain. The cause of the pain is usually due to obstruction of the infundibulum or duct draining the sinus which opens in the middle meatus of the nose.

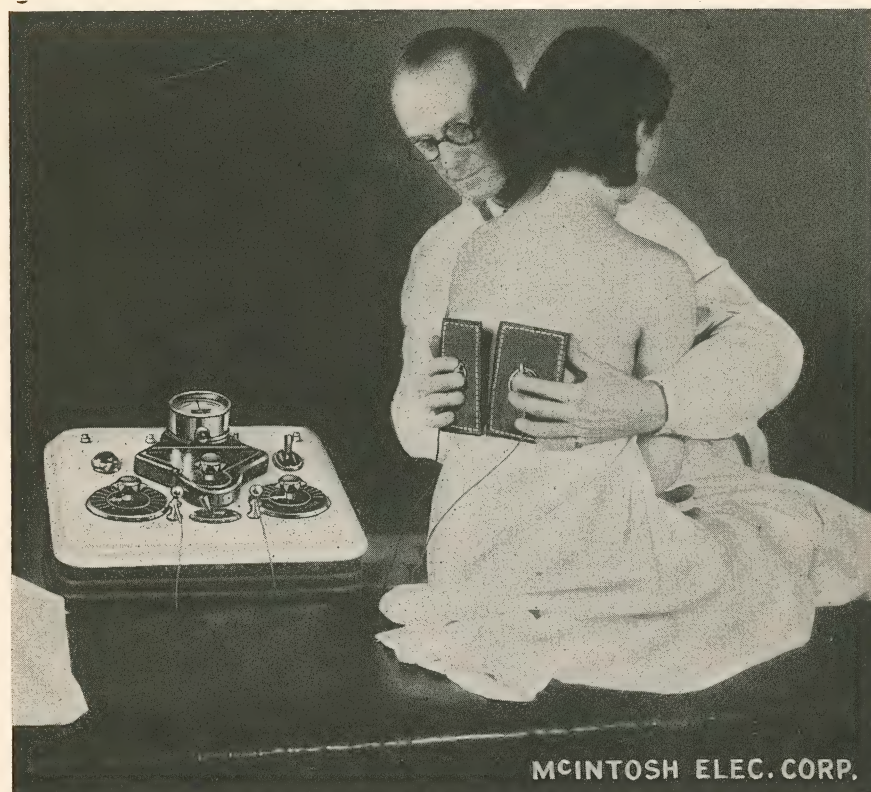
First we must open this duct and institute drainage. To do this, cover the terminal of your cord with cotton soaked in a weak adrenalin solution mixed half and half with Zn SO_4 , $\frac{1}{2}$ of 1%, and insert it well up in the middle meatus. Connect to the positive pole of the galvanic current, the negative being attached to a 3" x 5" pad on the chest, and give 3 M.A. of current for 5 minutes. Then remove and have the patient take a deep breath, close the other nostril and forcibly breathe through the affected side. The vaso-constrictor action of the positive pole and adrenalin usually opens the duct, the suction caused by the rush of air usually produces a discharge of the sinus, followed by a gratifying relief. Eberhart follows this treatment with indirect Tesla or Oudin heat over the sinus.

SPLANCHNOPTOSIS

SYNONYM—Pendulous abdomen. Bay window. Prolapsed abdomen. Glénard's disease.

ETIOLOGY—Falling of the stomach and intestines to lower pelvis. Dropping of all the abdominal viscera.

TREATMENT—See "Neurasthenia"—page 97.



Treating Splanchnoptosis. The "Polysine" is especially well adapted to the treatment of general Splanchnoptosis, abdominal hyperemia and constipation, as these cases require a very low rate of contractions and exceedingly fine control

In the treatment of general splanchnoptosis, abdominal hyperemia with resultant cerebral anemia and constipation, Ireland suggests the following technique:

Use No. 8, Pulsating Galvanic Sinusoidal. Place 2" x 3" pads over the 7th and 8th dorsal nerves, directly under angle of shoulder blades, one on each side, patient lying down on back. Turn on current to patient's comfortable tolerance and treat for 10 to 15 minutes. 6 to 8 contractions per minute. Repeat 3 times a week.

SUBINVOLUTION OF UTERUS

SYNONYM—Large uterus, following childbirth.

ETIOLOGY—Childbirth.

TREATMENT—(Eberhart) Two methods are available. One is the use of the Interrupted Galvanic Current with negative electrode over the fourth lumbar center, 12th dorsal in the spine, and the other in the cervix. Contractions will occur with each interruption of the current connected to positive pole. Treatment should not last over 5 minutes. The positive electrode is in the cervix. 15 to 20 interruptions per minute.

A better method is the use of the Interrupted Rapid Sinusoidal current, which may be used with one large metal electrode in the vagina and a covered electrode over the fourth lumbar; or both electrodes may be placed on the spine, separated a little distance from one another. The vital point is that the 4th lumbar center, which is the uterine center, shall be covered by one electrode. Treat for 5 to 7 minutes. 15 to 20 interruptions per minute.

Ireland's technique of treating through the nerve reflexes is illustrated and described below.

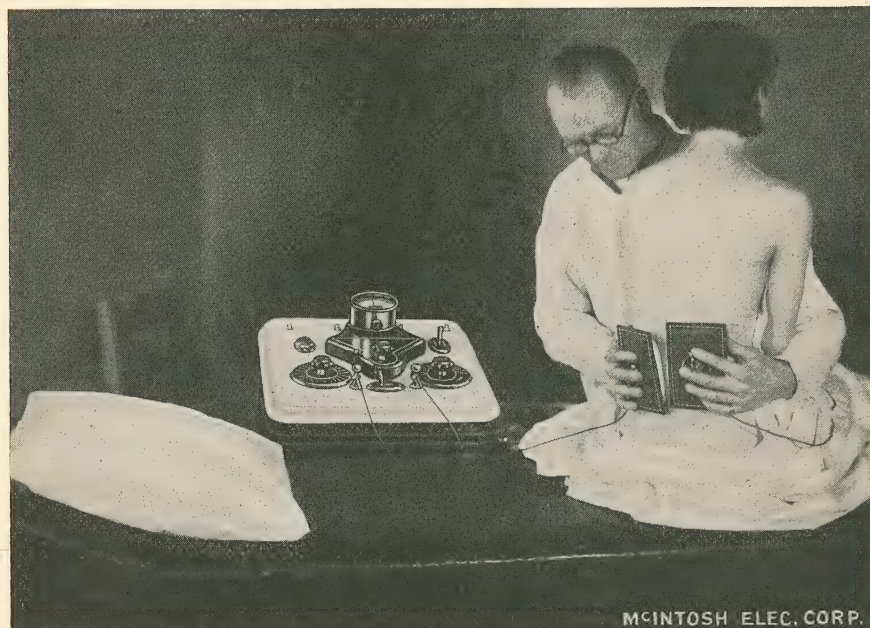
ATONY OR SUBINVOLUTION OF UTERUS

(Ireland)

SYNONYM—Large uterus, following childbirth.

ETIOLOGY—Childbirth.

TREATMENT—(Ireland) Use Modality No. 10, Oscillatory Wave Sustained Peak. Place one 3" x 5" pad electrode on each side of the first three lumbar vertebrae (viscero-vasomotor reflex of contraction and stimulation of uterus).



Subinvolution of the Uterus responds well to the gentle massage with the Oscillatory Wave, and the desired effect may be accomplished in a very short time

With the current turned on to patient's comfortable tolerance, contractions of the uterus are easily felt, as the gentle massage this current gives accomplishes the desired effect in a very short time. Give 15 to 20 contractions per minute. Treat 10 to 15 minutes. Repeat 3 times a week.

TRACHOMA

SYNONYM—Highly Contagious, granular conjunctivitis. Granular eyelids.

ETIOLOGY—Racial infections, poor health, unsanitary living conditions.

TREATMENT—(Eberhart) Use the same technique as given under "Granulated Eyelids." Very good results are obtained in this otherwise intractable condition.

ULCERS

SYNONYMS—Local open sores. Running sores.

ETIOLOGY—Highly acid or highly alkaline condition of patient. Traumatism. Local infection. Faulty pancreatic secretion. Lack of calcium in blood stream.

TREATMENT—(Cumberbatch) Cumberbatch prefers zinc ionization and states that old ulcers improve at once and heal rapidly. Occasionally zinc ions will not heal. He then employs Potassium Iodide 1% at the negative terminal and states, "This method will often succeed when all others have failed. Very slowly healing gunshot wounds can be made to heal rapidly."

Eberhart says, "Short Ultra-Violet radiation is signally successful in ulcers." If acid ulcer, use negative galvanism; if alkaline ulcer, use positive galvanism.

URETHRAL STRICTURES

SYNONYM—Tight urethra.

ETIOLOGY—Gonorrhea. Traumatism or direct injury. Syphilis. Organic stricture. Spastic contraction.

TREATMENT—(Neiswanger, Eberhart) The technique is simple and may be briefly given as follows: The caliber of the stricture is taken in the usual manner with any set of urethral sounds, then an olive-pointed electrode about two sizes larger than the caliber of the stricture, is attached to the negative pole of a galvanic current and introduced into the urethra so as to engage the stricture. The positive pole is a 4" x 6" pad placed on the abdomen or any convenient point. The current is slowly turned on in accordance with patient's tolerance, which will be somewhere between one to five milliamperes, depending on the size of the stricture and the size of olive

GLEANINGS OF LOW VOLTAGE TECHNIQUE

used. No appreciable amount of pressure is used, but the electrode is allowed, by its own weight, to slowly pass through the stricture, which it will generally do in from two to five minutes. The current is then turned off, the electrode withdrawn and the operation not repeated sooner than five to seven



No. 6021. Urethral Electrode Insulated with hard rubber and provided with Detachable Tips



No. 6070. Olive Tips, for use with Urethral Electrode No. 6021. Set of 12, sizes 12 to 32 French

days. At this time use the next larger olive point. In this manner the caliber of the stricture is gradually enlarged to a suitable size and much of the scar tissue softened and absorbed. Occasionally the same size olive may have to be used for two seances.

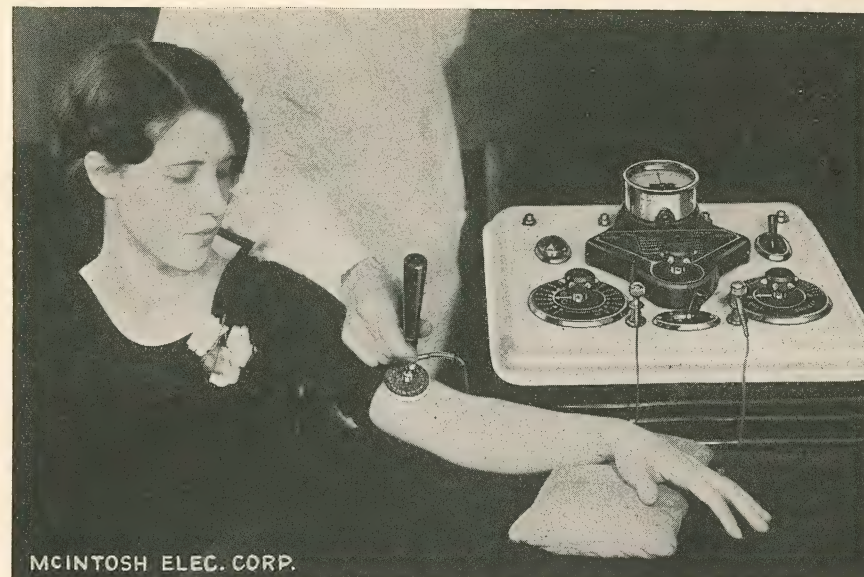
WRIST DROP

SYNONYM—Paralysis of the wrist.

ETIOLOGY—Occupation. Injury to the forearm. Fatigue. Traumatism. Lead poisoning. Malnutrition.

TREATMENT—(Ireland) Use No. 13, Interrupted Rapid Sinusoidal. Apply a 3" x 5" pad over brachial plexus. Place active electrode (spongio disc) over the motor points of the various muscles supplied by the musculo-spiral nerve, which supplies the extensors of the forearm and hand.

GLEANINGS OF LOW VOLTAGE TECHNIQUE



In the Treatment of Wrist Drop the Interrupted Rapid Sinusoidal has proven a valuable and highly efficient modality

Patient sitting up with arm in a comfortable and relaxed position. Regulate the current to from six to eight interruptions per minute and apply to patient's comfortable tolerance. Begin treatment at first three or four minutes and then gradually increase time as improvement shows, to 10 or 15 minutes. *Do not over-stimulate.*

CONCLUSION

Many other diseases and conditions are amenable to treatment by the various means of Physical Therapy and the Polysine Generator in particular. It would be impossible to cover them all in a text of this size.

The author will be very glad to co-operate with members of the profession at any time in perfecting their technique to obtain gratifying results from the many different modalities available in the Polysine Generator which meets every practical requirement for low voltage therapy.

EXPLANATION OF ELECTRICAL TERMS

"No field of medicine," says Grover, "offers greater encouragement for study and application than does that of Electrotherapy."

Electrotherapeutics today is no longer shrouded in mystery; it is not based on psychology; it is an exact science. To quote from Eberhart, "The laws governing electricity are as definite and exact as those of mathematics and it may be employed with assurance of a definite result, if used as indicated by the physiological action of its various forms."

The physician who is taking up the use of Galvanic and Sinusoidal currents (low voltage wave currents), will therefore, do well to familiarize himself with certain fundamental laws of electricity.

The flow of an electric current, according to our present conception, consists of the motion of great numbers of extremely small particles of electricity called *Electrons*. An electron is thousands of times smaller than an atom.

In measuring electrical currents, the units most frequently referred to are amperes, milliamperes, volts and ohms.

ONE AMPERE is the unit measuring the intensity of the current, or its rate of flow. It may be compared to the rate of flow of water through a pipe measured in gallons per second.

ONE MILLIAMPERE is one one-thousandth of an ampere, and is used as the medical unit.

ONE VOLT is the unit for measuring the pressure or electromotive force (E. M. F.). Just as we must have a certain "head" to cause the water to flow through a pipe, so we must have a certain voltage to cause the electric current to flow through a conductor.

The OHM is the unit for measuring electrical resistance. The resistance of a conductor depends on its size and shape as well as

the material of which it is made. The skin, muscular fibers, soft tissues and body fluids, all offer varying degrees of resistance to the passage of the current through the body.

The general rule is:

- (1) The current (amperes) increases as the pressure (volts) increases.
- (2) The current decreases as the resistance (ohms) increases.

This principle was first stated by Ohm, a German Physicist, and is expressed in the formula known as "Ohm's Law."

$$\text{Amperes} = \frac{\text{Volts}}{\text{Ohms}}$$

Therefore, a pressure of one volt will cause a current of one ampere to flow in a conductor having a resistance of one ohm.

When a current flows constantly in the same direction through a circuit, as a current from a battery, it is called a direct or Galvanic current.

When the current of a circuit changes in value and reverses its flow in direction at given intervals, it is called an Alternating current. A current whose value varies as the ordinate of a sine curve is known as a Sine Wave Current, or Sinusoidal Current.

If an alternating current has passed through a complete set of positive and negative values, the current has completed what is called a cycle. The number of cycles through which the current values pass in one second is called the frequency of the current. Thus in the 60-cycle current as obtained from a lamp socket in alternating current districts, the time required by the current to complete one cycle is one-sixtieth of a second.

In the practice of modern Physiotherapy the selection of proper frequencies is an important factor and is dealt with more in detail in a separate chapter.

INSTITUTIONS USING THE POLYSINE GENERATOR AND OTHER McINTOSH APPARATUS

From time to time the author has been asked as to whether the McIntosh Polysine Generator is widely used and also the names of more prominent institutions incorporating this apparatus in their Physical Therapy Departments along with other McIntosh equipment. Following is a partial list furnished by the manufacturer in answer to these questions.

CALIFORNIA

Glendale Sanitarium.....Glendale
Roosevelt Hospital.....Los Angeles
Georgia Receiving Hospital.....Los Angeles
Good Samaritan Hospital.....Los Angeles
L. A. General Hospital.....Los Angeles
Medical Surgical Inst.....Los Angeles
Pasadena Hospital.....Pasadena
Riverside Community Hospital.....Riverside
Sutter Hospital.....Sacramento
St. Joseph's Hospital.....San Francisco
St. Francis Hospital.....San Francisco
Mills Memorial Hospital.....San Mateo
U. S. Veterans' Home.....Sawtelle

CONNECTICUT

Norwalk Hospital.....Norwalk

DIST. OF COLUMBIA

St. Elizabeth's Hospital.....Washington

GEORGIA

U. S. Veterans' Hospital No. 48.....Atlanta
U. S. Marine Hospital.....Savannah

ILLINOIS

Cook County Hospital.....Chicago
Illinois Central Hospital.....Chicago
Lake View Hospital.....Chicago
American Hospital.....Chicago
St. Anthony's Hospital.....Chicago
Shriner's Hospital.....Chicago
Michael Reese Hospital.....Chicago
Madison County Sanitarium.....Edwardsville
U. S. Veterans' Hospital.....Hines

MARYLAND

U. S. Naval Academy.....Annapolis
St. Joseph's Hospital.....Baltimore

MASSACHUSETTS

U. S. Veterans' Hospital.....Bedford
Boston City Hospital.....Boston
U. S. Marine Hospital.....Chelsea
U. S. Naval Hospital.....Chelsea
New England San. & Hosp.....Melrose

MICHIGAN

St. Joseph Mercy Hospital.....Detroit

NEW JERSEY

N. J. Medical Center.....Jersey City
Middlesex County Gen. Hosp. New Brunswick
Passaic Hospital.....Passaic
New Jersey Rehabilitation Com'n.....Trenton

NEW YORK

L. I. College Hospital.....Brooklyn
U. S. Marine Hospital.....Buffalo
Public Health Service.....Ellis Island
U. S. Marine Hospital.....Ellis Island
Bellevue Hospital.....New York

Hospital Joint Diseases.....New York
Beth Israel Hospital.....New York
Mount Sinai Hospital.....New York
Vanderbilt Clinic.....New York
U. S. Veterans' Bureau.....New York
Harlem Hospital.....New York
U. S. Marine Hospital No. 70.....New York
Post Graduate Hospital.....New York
Reconstruction Hospital.....New York
U. S. Veterans' Hospital.....Northport, L. I.
Convalescent Home for Hebrew Children.....Rockaway Park, L. I.
Nassau County Hospital.....Rockville Center
U. S. Marine Hospital.....Staten Island

OHIO

St. Vincent's Hospital.....Toledo

OREGON

Grande Ronde Hospital.....LaGrande
The Dalles Hospital.....The Dalles
Charlton Hospital.....Tillamook

PENNSYLVANIA

Children's Hospital.....Idlewild
Mercy Hospital.....Johnstown
Clayborne Private Hospital.....Johnstown
Columbia Steel Co. Hospital.....Johnstown
Conemaugh Valley Memorial Hosp. Johnstown
U. S. Veterans' Bureau Hospitals. Philadelphia
U. S. Naval Hospital.....Philadelphia
Temple University.....Philadelphia
Hahnemann Hospital.....Philadelphia
Pittsburgh Hospital.....Pittsburgh
West Penn Hospital.....Pittsburgh
Allegheny General Hospital.....Pittsburgh
Carnegie Steel Co. Hosp. (Wards). Pittsburgh
Carnegie Steel Co., St. Francis Hospital.....Pittsburgh
South Side Hospital.....Pittsburgh
Children's Hospital.....Pittsburgh
U. S. Veterans' Hospital.....Pittsburgh
Allegheny Valley Hospital.....Tarentum
Peters Private Hospital.....Uniontown

VERMONT

St. Albans' Hospital.....St. Albans

VIRGINIA

U. S. National Soldiers' Home.....
.....National Soldiers' Home

WASHINGTON

St. Luke's Hospital.....Centralia
Sisters Hospital.....Colfax
Providence Hospital.....Seattle
Deaconess Hospital.....Spokane
Holy Cross Hospital.....Spokane
Walla Walla Sanitarium.....Walla Walla

WEST VIRGINIA

St. Mary's Hospital.....Clarksburg

ILLUSTRATIONS

TITLE	PAGE
Frontispiece	
Polysine Generator No. 1258.....	2
Kantbern Pads	7
Special Electrodes and Accessories.....	9
Ireland Chart	14
Polysine Generator No. 1258.....	20
Graph of Current Intensities.....	24
Control Panel of Polysine Generator, No. 1258.....	26
Graph, Galvanic Current	27
Graph, Interrupted Galvanic Current.....	27
Graph, Galvanic Wave Current	28
Graph, Galvanic Wave, Sustained Peak Current.....	28
Graph, Combined Galvanic and Sinusoidal Current.....	28
Graph, Super-Imposed Wave Current.....	29
Graph, Galvanic Sinusoidal Current.....	29
Graph, Pulsating Galvanic Sinusoidal Current.....	30
Graph, Oscillatory Wave Current.....	30
Graph, Oscillatory Wave, Sustained Peak Current.....	31
Graph, Interrupted Oscillatory Wave Current.....	31
Graph, Waveless Oscillatory Current.....	32
Graph, Interrupted Rapid Sinusoidal Current.....	32
Graph, Rapid Sinusoidal Wave Current.....	33
Graph, Rapid Sinusoidal Wave, Sustained Peak Current.....	33
Graph, Rapid Sinusoidal Current.....	34
No. 6117 Intra-Uterine Electrode (Golet's).....	40
Treatment of Bell's Palsy.....	45
Treatment of Brachial Neuritis	46
No. 6099 Uterine Copper Electrodes.....	49
No. 8660 Metro-Coagulator	51
No. 8544 Remington Cervical Coagulation Set.....	52
Remington Technique Illustrations	54
Remington Technique Illustrations	55
Treatment Duodenal Ulcer	64
Treatment Dysmenorrhea	66
Hayes Bulbous-Pointed Needle.....	70
Treatment of Fallen Arches	73
Treatment of Foot Drop	76
Treatment of Drainage of Gall Bladder.....	79
Treatment of Simple Goiter.....	80
No. 6146 Neiswanger Goiter Electrode.....	81
No. 6131 Neiswanger Bag Electrode	81
Treatment of Granulated Eyelids.....	83
No. 6053 Neiswanger Copper Rectal Electrode.....	85
No. 6137 Eberhart Copper Rectal Electrode.....	85
No. 6103 Urethral Electrode	87
No. 6095 Neiswanger Vaginal Cataphoric Electrode.....	90
No. 6131 Neiswanger Bag Electrode	92
Treatment Stimulation of Mammary Glands.....	94
No. 6116 Copper Ball Vaginal Electrode.....	95
No. 6207 Needle Holder	96
No. 6262 Messiaur Aural Ionizing Chamber.....	101
Treatment of Otitis Media.....	102
No. 6136 Eberhart's Prostatic Electrode.....	104
Treatment of Ptosis of Eyelid.....	106
Testing Reaction of Degeneration.....	107
Treatment of Rhinitis	108
Treatment of Splanchnoptosis	110
Treatment of Subinvolution of Uterus.....	112
No. 6021 Urethral Electrode	114
No. 6070 Olive Tips	114
Treatment of Wrist Drop.....	115

SUBJECT INDEX

TITLE	PAGE
Galvanism	1
Medical Ionization	3
A Few Simple Tests for Galvanic and Sinusoidal Currents.....	6
Electrodes	7
Frequency of Sine Waves and Interruptions—An Important Factor....	10
Is It Desirable to Combine Sine Waves with Diathermy?.....	11
A Review of Myology.....	11
Striated Muscles	12
Unstriated Muscles	12
The Use of Spinal Reflexes.....	13
Electro-Diagnosis of Nerves and Muscles.....	15
Preparation of the Patient.....	18
The McIntosh Polysine Generator, Model No. 1258.....	19
Modalities Available from Polysine Generator, No. 1258.....	27
Principles Governing the Placing of Electrodes.....	35
Manual of Technique.....	37
Conclusion	115
Explanation of Electrical Terms.....	116
Institutions Using Polysine Generator.....	118

MODALITY INDEX

TITLE	PAGE
No. 1, Galvanic Current	27
No. 2, Interrupted Galvanic Current.....	27
No. 3, Galvanic Wave Current	28
No. 4, Galvanic Wave Sustained Peak Current.....	28
No. 5, Combined Galvanic and Sinusoidal Current.....	28
No. 6, Super-Imposed Wave Current.....	29
No. 7, Galvanic Sinusoidal Current.....	29
No. 8, Pulsating Galvanic Sinusoidal Current.....	30
No. 9, Oscillatory Wave Current	30
No. 10, Oscillatory Wave, Sustained Peak Current.....	31
No. 11, Interrupted Oscillatory Wave Current.....	31
No. 12, Waveless Oscillatory Current.....	32
No. 13, Interrupted Rapid Sinusoidal Current.....	32
No. 14, Rapid Sinusoidal Wave Current	33
No. 15, Rapid Sinusoidal Wave, Sustained Peak Current.....	33
No. 16, Rapid Sinusoidal Current	34

MANUAL OF TECHNIQUE

TITLE	PAGE
Achondroplasia	37
Acidosis	37
Acne	38
Acroparesthesia	38
Adhesions	38

MANUAL OF TECHNIQUE—Continued

TITLE	PAGE
Adiposis Dolorosa.....	39
Amenorrhea	39
Anal Fissure.....	40
Angina Pectoris.....	40
Ankylosis	41
Apoplexy	41
Appendicitis, Chronic.....	41
Aptyalism	42
Arterio-Sclerosis	42
Arthritis	43
Asthma	43
Ataxia, Locomotor.....	43
Atrophy, Progressive Muscular.....	44
Bed Sores.....	44
Bell's Palsy.....	44
Brachial Neuritis	45
Brachial Plexus Paralysis.....	46
Bulbar Paralysis.....	47
Cervical Catarrh (<i>Neiswanger</i>).....	47
Cervical Erosions (<i>Eberhart</i>).....	48
Cervicitis and Endometritis (<i>Eberhart</i>).....	49
Chronic Endocervicitis (<i>Remington</i>).....	51
Chlorosis (<i>Remington</i>).....	56
Cholecystitis (<i>Remington</i>).....	57
Chordee	58
Claudication, Intermittent (<i>Remington</i>).....	58
Coccydynia (<i>Remington</i>).....	58
Colitis Mucous (<i>Remington</i>).....	59
Colorless Stools (<i>Remington</i>).....	60
Constipation	61
Corneal Ulcer.....	62
Cystitis	63
Diabetes	63
Duodenal Ulcer.....	64
Dysmenorrhea (<i>Neiswanger</i>).....	65
Dysmenorrhea, Painful.....	68
Dyspepsia, Nervous.....	68
Dystrophy, Progressive Muscular.....	68
Endometritis	69
Entropion	69
Enuresis	69
Epilation (<i>Neiswanger</i>).....	70
Epistaxis	72
Fallen Arches.....	72
Feet, Painful.....	73
Fistula	75
Flat Foot.....	75

MANUAL OF TECHNIQUE—Continued

TITLE	PAGE
Foot Drop.....	75
Functional Impotency (<i>Remington</i>).....	76
Gall Bladder, Drainage of (<i>Ireland</i>).....	78
Glaucoma	79
Goiter, Simple (<i>Eberhart</i>).....	80
Gonorrhea in the Female.....	81
Granulated Eyelids (<i>Eberhart</i>).....	82
Hordeolum	83
Hay Fever (<i>Remington</i>).....	83
Hemorrhoids	84
Hiccough, Persistent.....	86
Hypersensitive Urethra.....	86
Impotency	87
Impotency, Male and Female.....	87
Infantile Uterus.....	87
Intestinal Stasis.....	88
Keloid	89
Leucorrhea (<i>Remington-Eberhart</i>).....	90
Lumbago	92
Mammary Gland Atelia.....	93
Mammary Gland, Stimulation of Secretion of.....	93
Menorrhagia	94
Metorrhagia	95
Myalgia	96
Nevus Pigmentosus, Removal of (<i>Neiswanger</i>).....	96
Neurasthenia	97
Neuritis	99
Obesity	100
Otalgia	100
Otitis Media.....	101
Poliomyelitis, Anterior.....	102
Proctitis	103
Prostatic Diseases	104
Prostatic Hypertrophy	104
Pruritus Ani.....	105
Ptosis of Eyelid.....	105
Reaction of Degeneration, Testing.....	106
Rhinitis	107
Sciatica	108
Sinusitis, Frontal.....	109
Splanchnoptosis	109
Subinvolution of Uterus.....	111
Atony or Subinvolution of Uterus (<i>Ireland</i>).....	111
Trachoma	112
Ulcers	113
Urethral Strictures.....	113
Wrist Drop.....	114

A Thought for All of Us

"Be not the first by whom the new is tried,
Nor yet the last to lay the old aside."

—Alexander Pope.